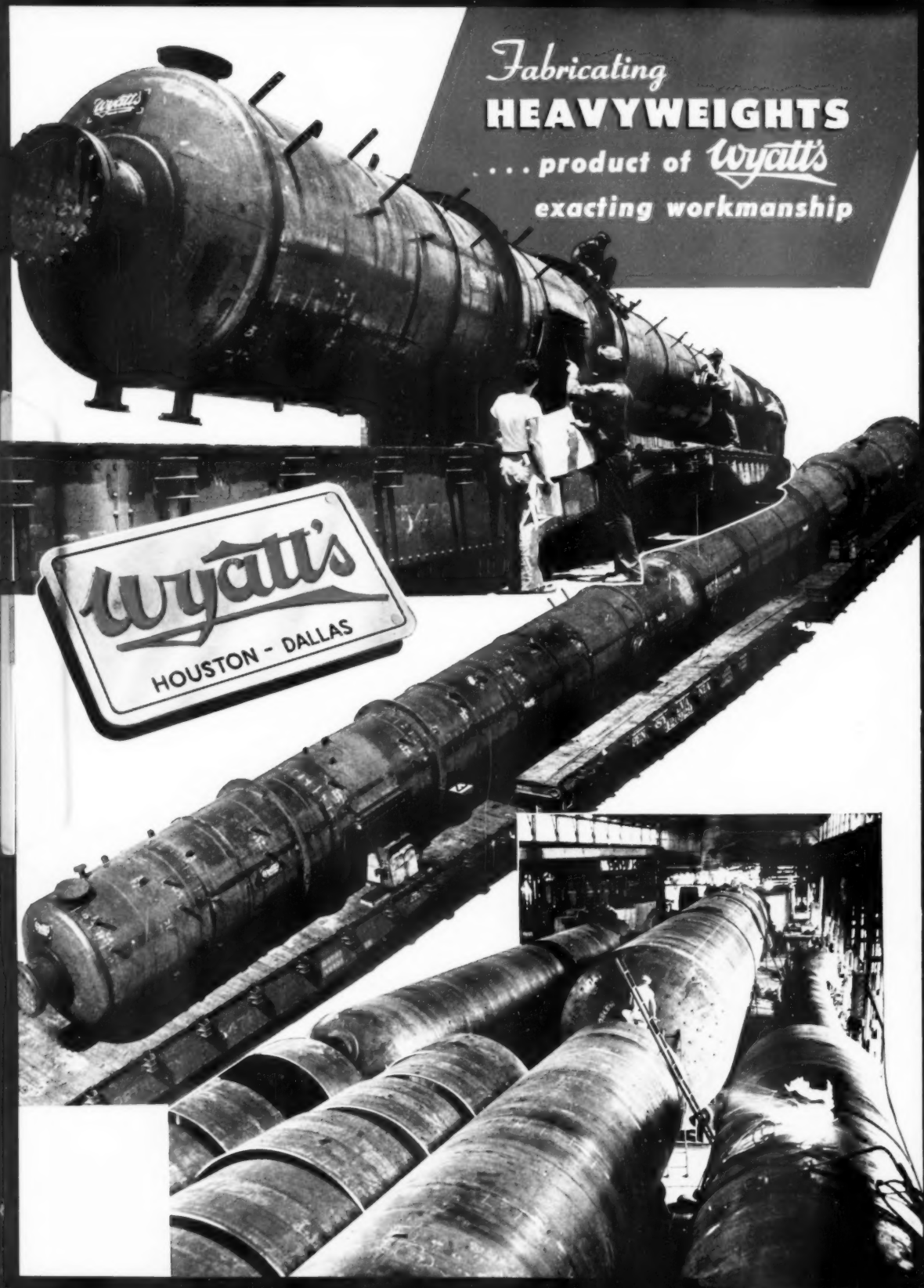
the OIL AND GAS JOURNAL

TC-49-1

TRETOLITE COMPANY
Manufacturing Chemists
ST. LOUIS 19, MISSOURI • LOS ANGELES 22, CALIFORNIA
DEHYDRATING DESALTING

PRICE 50 CENTS TABLE OF CONTENTS PAGE 37 DECEMBER 15 1949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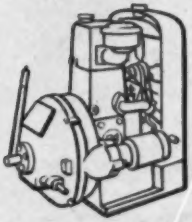
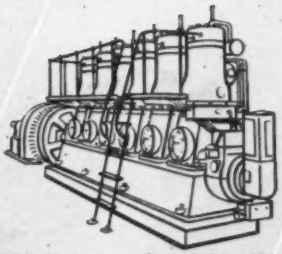
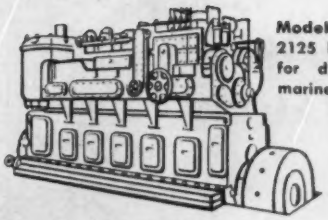
District Laboratories: Wilmington, Del. · Chicago, Ill. · Tulsa, Okla. · Houston, Texas · El Monte, Calif.

Model 45B: 5¼ horsepower engine for stationary and marine service.



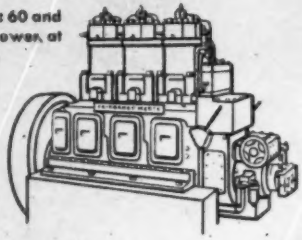


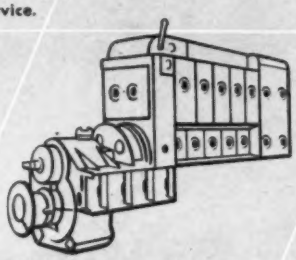
Model 32: Horsepower from 120 to 450. For slow-speed heavy-duty service.



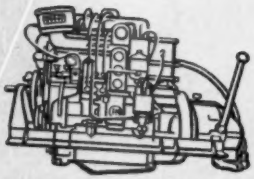
Model 37: 500 to 2125 horsepower for direct drive marine service.

Model 42: 60 and 90 horsepower at 450 r.p.m.

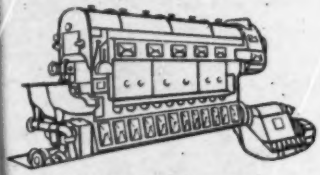




Model 31: Horsepower from 175 to 500; with 2 to 1 reduction gears optional for marine service.

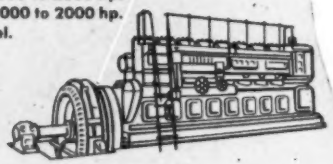


Model 48 Marine Engine: Also available for stationary or portable service. 3.5 to 80 hp.



Model 38 Opposed-Piston Engine: Horsepower from 960 to 1920 with 2 to 1 reduction gear for marine service.

Model 33 Stationary Engine: 500 to 2000 hp. Diesel, 1000 to 2000 hp. Dual Fuel.



When it comes to Diesel Power . . .

From 3.5 hp. to 3500 hp.

Low-cost, efficient power for all oil field services . . . modern, dependable power for drilling rigs, pumping stations, refineries . . . Fairbanks-Morse is the proved source for the full range of diesel applications. Many of the models illustrated here are available as dual-fuel diesels, an important oil field advantage. For skilled assistance and impartial recommendation for the diesel for your specific service, write Fairbanks, Morse & Co., Chicago 5, Ill.

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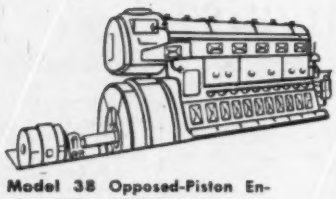
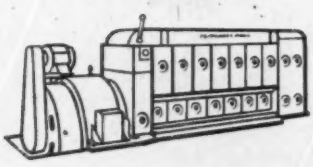
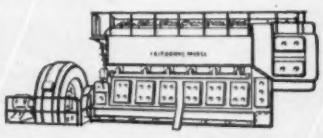


Model 38 Opposed-Piston Engine: 960 to 1920 horsepower at 720 r.p.m.



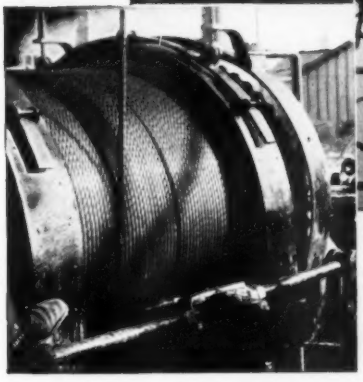
Model 31: Diesel generating set with kw. ratings from 118 to 360. Marine and stationary—Dual Fuel available in larger sizes.



Model 31: 2100 to 3500 horsepower diesel or dual fuel engine for heavy-duty stationary service.

Macwhyte PREformed Rotary Lines

Correct for your drilling equipment



For maximum safety, service, dependability, use Macwhyte PREformed Monarch Whyte Strand Rotary Lines.

It's PREformed for flexibility, easy handling and maximum service. It runs smoothly through blocks and spools evenly on drum.

Internal Lubrication covers every wire in the line . . . protecting unseen inside wires. Monarch Whyte Strand PREformed Rotary Lines are available in the size and length you need. Macwhyte Distributors and Mill Depots — carry stocks for immediate delivery. Macwhyte representatives will recommend the correct line for your equipment.

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Manufacturers of Internally Lubricated Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies.

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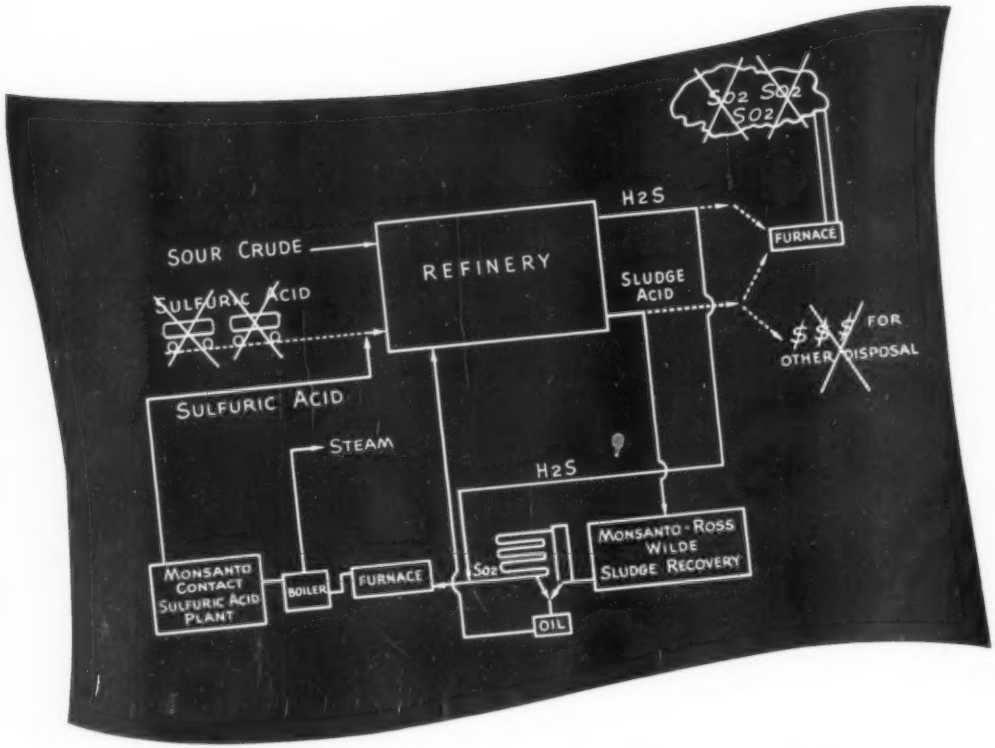

How to change sludge acid into dollars

Monsanto now brings you a thoroughly-proved process for recovering oil and new, clean, high-grade sulfuric acid from sludge acid . . . and if you have H_2S, you can use it too. Thus, refinery wastes are *changed into dollars* . . . dollars added to the *profit* end of income.

The Monsanto process *saves dollars* now spent to dispose of sludge acid and H_2S . . . an important economy for many refineries. And it gives you a *plus value* in better community relations by eliminating pollution of the air and streams.

The process *earns dollars* by recovering oil which can be refined into salable products . . . by producing sulfuric acid needed for your refinery processes . . . by generating steam that can be employed in your operations.

Pull out the figures and see how much it's costing you to dispose of H_2S and sludge acid. Then, call in a Monsanto representative and see how economically you can install the Monsanto process to change these wastes into valuable products. You can get complete details, without cost or obligation, by mailing the coupon or contacting MONSANTO CHEMICAL COMPANY, Engineering Sales Department, 1745 South Second Street, St. Louis 4, Missouri.

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Without cost or obligation to my company, please send your representative to discuss ways of changing sludge acid and H_2S into dollars.

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Company _____
Street _____
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IDECO *Does It Again!*

new *Hydrair 7-11* rig uses LINK-BELT *Precision Steel* Roller Chain

Largest of IDECO's famous Hydrair rigs, this new "7-11"—like so many other Ideco rigs—uses Link-Belt Precision Steel Roller Chain as standard equipment.

Link-Belt got the call for the compound chain drives on this rig's 2 or 3 (optional) engines that pack 700 to 1050 H.P. The compound also provides for driving a slush-pump.

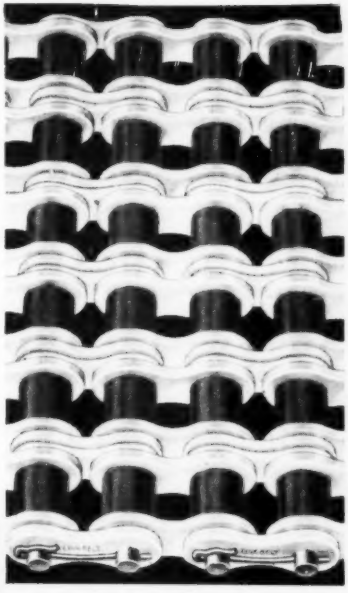
The drawworks chain on this rig is likewise Link-Belt. This Hydrair 7-11 offers propeller shaft drive—or Link-Belt Rotary Chain drive.

Oil field equipment manufacturers know how to get the best performance out of their equipment — that's why so many manufacturers standardize on Link-Belt chain. Operators who follow that tip know that Link-Belt Precision Steel Roller Chains deliver *longer service . . . with less maintenance*.

Our engineers will be glad to assist you on any power transmission problem. Just phone or write us—there's no obligation.

LINK-BELT COMPANY

Indianapolis 6, Dallas 1, Houston 1, Kansas City 6, Mo., Los Angeles 33, New York 7, Toronto 8.
Offices in Principal Cities. 11,617



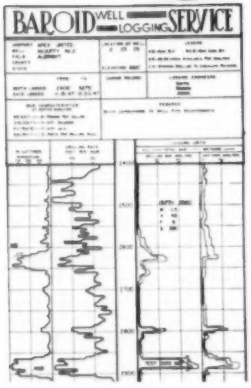
LINK-BELT
Precision Steel
ROLLER CHAIN

≻ E-Z-ASSEMBLY ≺

Link-Belt engineers have developed a construction that makes assembly and disassembly of multiple-width chains in the field much easier. With this feature, load distribution across the width of the chain is maintained.

The Oil and Gas Journal, published Thursdays by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910, at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $3 yearly. Copyright 1949.

Baroid WELL LOGGING SERVICE



MUD ANALYSIS
AND CUTTING
ANALYSIS
COMBINED
IN ONE LOG

Provides accurate Formation Information
AS YOU DRILL!

Whether the bit is cutting soft, unconsolidated sand or hard rock, the Baroid Well Logging Service combination of Mud-Analysis and Cutting-Analysis correlates with the Drilling Rate Curve to indicate the oil and gas shows, porosity and permeability.

You save valuable rig time and money because only necessary cores need be taken. Check the experience of the drillers of more than two million feet of Baroid Logged hole and learn for yourself the advantages of this direct logging service for wildcat drilling.

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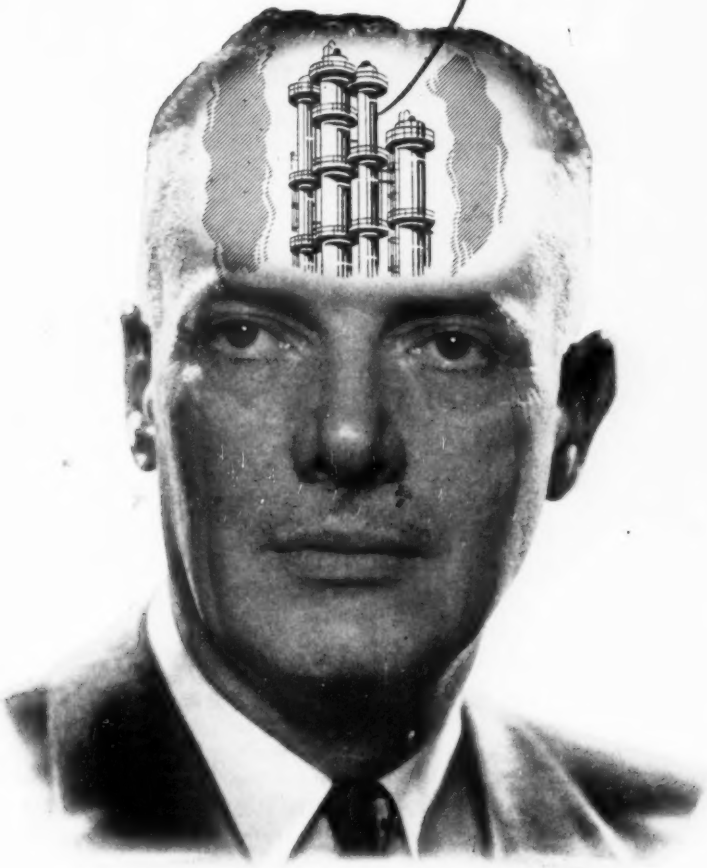
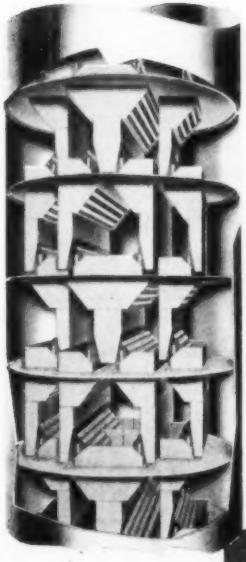
to the man with a fractionating problem





Give us an opportunity to solve your most difficult problems. Because of the unlimited flexibility in its design, the Koch Kaskade fractionating tray will fit simple or out-of-the-ordinary process conditions better than any bubble tray.

For absorption, scrubbing, liquid-liquid contacting and fractionation, simply write and tell us vapor and liquid densities and loadings, and we'll be glad to give you our recommendation, without obligation.

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Lubrex 45, a product of Hardesty research, fits the demand for a polyunsaturate-free fatty acid especially designed for soap and lubricating grease manufacture. The fatty acids in Lubrex 45 are stabilized in our new hydrogenation unit, to give them a greater resistance to heat discoloration. Freedom from polyunsaturated fatty acids prevents rancidity or gum formation from excess unsaturation. No highly unsaturated acids remain to act as agents for polymerization. The melting point of Lubrex 45 has been accurately controlled to give the optimum possible degree of hardness for your precise requirements. Color and uniformity are strictly maintained.

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184 mph top speed at sea level. Cruises at 170 mph at 8,000 feet, using less than 60% of maximum rated take-off power. No engine overload.

economy!

Only 9½ gallons of fuel consumed per hour. Four people with baggage carried at seat-mile cost as low as 1¼ cents.

safety!

Sturdy framework results in extra safety margins. Rated in utility category at full gross weight, with limit flight load factor of 4.4 G's. plane was subjected successfully to special tests not required by CAA.

strength where it counts!

Note low, sturdy landing gear with wide tread and exclusive cross-bracing of struts. Nose gear position, plus long wheelbase, eliminates pitching, allows greater braking.

style and comfort!

Sound-proofed cabin, handsome roomy interior, room for four six-footers. Ease of entry and exit because of wide autotype door.

. . . then you'll see why it's a better buy!

Compare these performance features

- Top speed, 184 mph
- Cruising speed, 170 mph
- Range, 750 miles
- Service ceiling, 17,100 feet
- Fuel economy, 9½ gal. per hour

Compare these comfort features

- Exclusive retractable step
- Limousine entrance
- Insulated, sound-proofed cabin
- Quickly removable rear seat
- Luggage compartment accessible two ways

You'll find other "extras" you'll appreciate when you actually see the Beechcraft Bonanza—like the exclusive retractable step, two-way accessibility of the luggage compartment, and maximum visibility. Go over the ship yourself, soon. And for illustrated brochures that go into more details, write today on your company letterhead to Beech Aircraft Corporation, Wichita, Kansas, U.S.A.

Beechcraft

BONANZA MODEL A35

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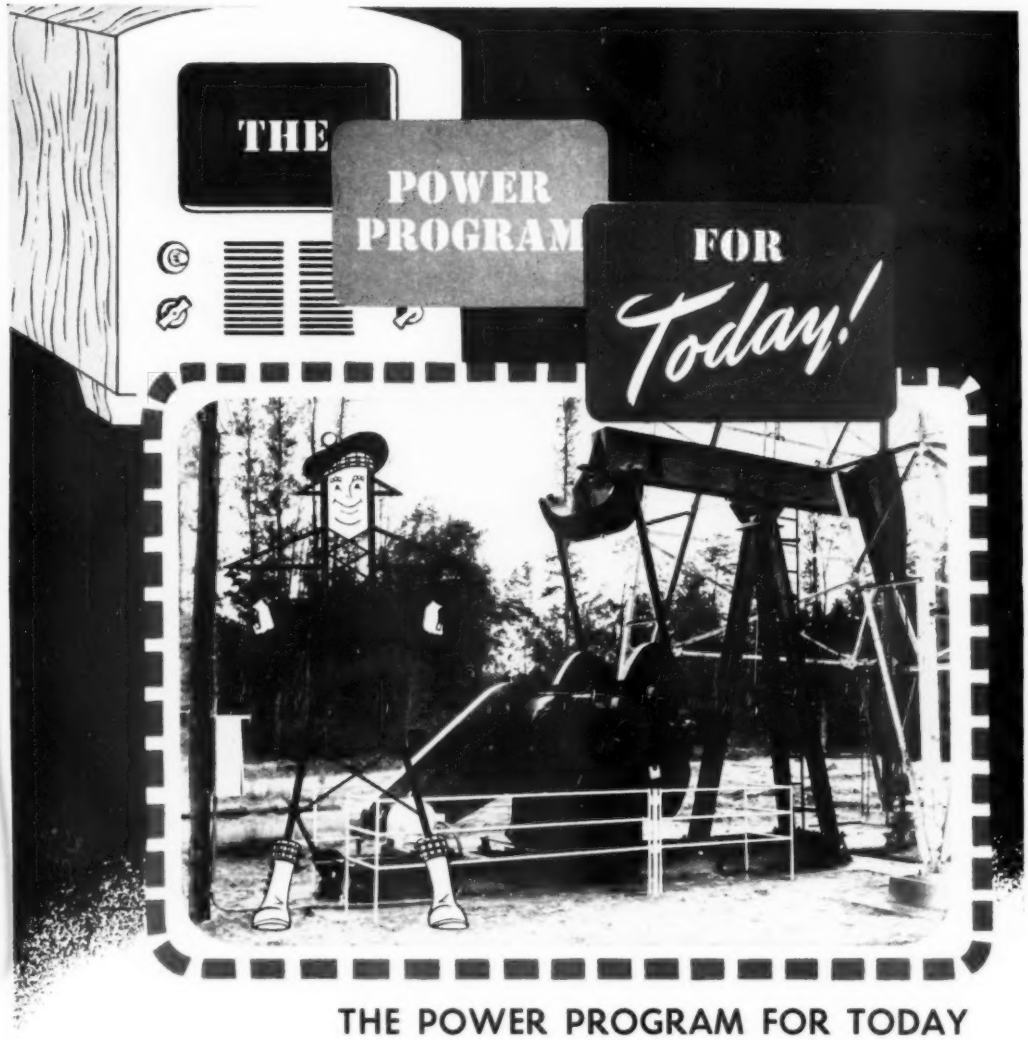

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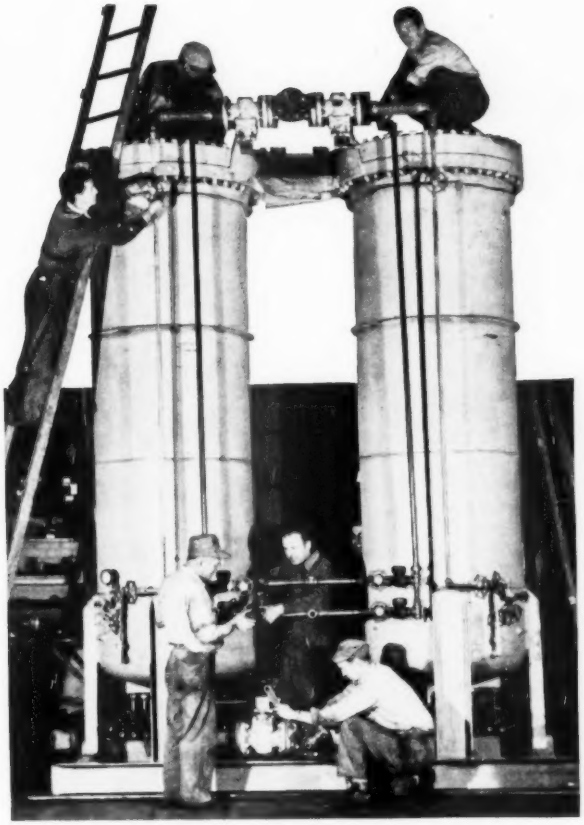

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Six men finished this Type BWC-3500 Lectrodryer in a hurry. An oil company needed it for propane drying.

Lectrodryers come in small sizes, too. This is the Laboratory Model.

Hundreds of Lectrodryers of all sizes are working for the Petroleum Industry—DRYing gas to avoid freeze-ups in pipe lines, DRYing compressed air supplied to instruments controlling refining processes, DRYing materials to keep sensitive reactions on the beam, DRYing warehouses to prevent spoilage of products in storage.

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LECTRODRYERS DRY WITH ACTIVATED ALUMINAS

LECTRODRYER

REGISTERED TRADEMARK U.S. PAT. OFF.

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For Orifice Meters, Regulators, Gage Lines, Instrument Panels, Christmas Trees, By-pass Lines, etc.

HERE'S A NEW DESIGN in instrument valves — forged steel for strength in high temperature or high pressure service; no bonnet joint, swing bolted gland for easy packing adjustment.

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Built in globe or angle design, screwed or socket welding ends, ¼ in., ⅜ in., and ½ in. sizes. Working pressure ratings 6000 lb WOG, 1500 lb at 850 F with carbon steel bodies, and 1500 lb at 1000 F with 13 per cent chromium EValloy stainless steel bodies. Write today for Bulletin 491.

ACTUAL VALVE SIZE ▶

NEW FIG. 952 SERIES

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Please send me Bulletin 491—on Fig. 952 Series

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JOIN THE TREND TO TOP

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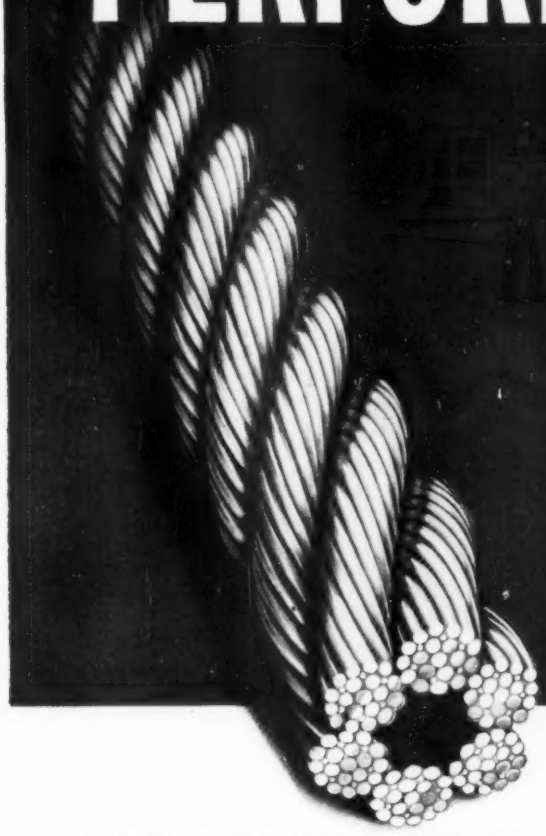

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"Blue Center"
Wire Rope

A FIRST SPECIFICATION AMONG OIL MEN

WHEN YOU PULL DOWN COSTS these days it's something to brag about. And with Preformed "Blue Center" Wire Rope you can cut costs to the minimum.

"Blue Center" Steel—made only by Roebling—provides shock resisting stamina and toughness. The Preforming process—improved and perfected—simplifies installation, reduces whipping and vibration, improves winding. It is not inclined to twist and kink . . . is easy to handle and install . . . can be cut without seizing. This combination of advantages gives unsurpassed life and serviceability.

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Car on modern chassis dynamometer originated by Texaco which approximates road-driving conditions in the laboratory.

•To achieve finer products, better performance, hundreds of Texaco research workers constantly make laboratory and field tests on fuels, lubricants, engines, cars and other equipment, and develop new refining and manufacturing methods.

To achieve conservation, Texaco pioneered in thermal cracking and other important ways to increase gasoline yields . . . is currently developing an effective method of producing fuels from natural gas, coal, and other carbonaceous products.

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Petroleum Promotes Progress

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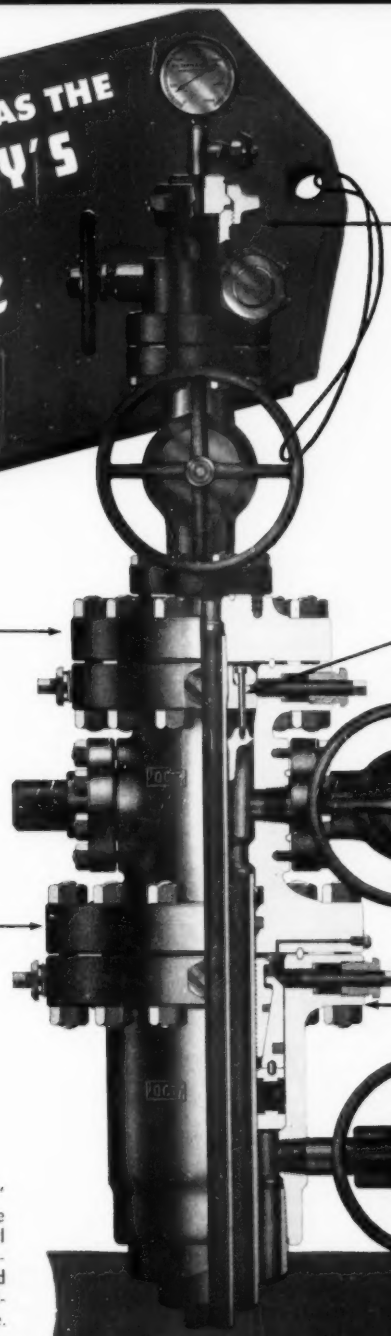
LABELED BY MANY AS THE OIL INDUSTRY'S MOST PRACTICAL WELLHEAD ASSEMBLY



JE-1 Flow Control . . . four pieces in one — quick change wing valve.

WA-4 Tubing Hanger—economical, flexible, fast — no costly permanent investment in rams.

B-2 Bonnet.

T-16-OU Tubing Head — dual seal, reduced pressure area. Low flange stress.

C-19 Casing Head — self-sealing, flexible, safe, fast installation.

With the flexible O-C-T "C-19" Casing Head as the foundation . . . the only casing head that meets every well completion condition with a single compact model . . . this O-C-T Wellhead and Tree Assembly has set a new standard for simplicity, for safety, for service.

This O-C-T Wellhead and Tree Assembly is the result of progressive O-C-T engineering and field service experience based on sound study, exhaustive laboratory work and field testing, by experience-qualified O-C-T Engineers.

Yes, it's O-C-T quality from top to bottom . . . labeled by many as the oil industry's most practical wellhead assembly. Write for complete engineering details.

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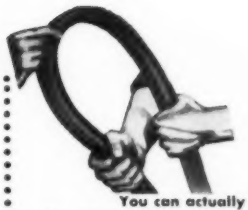
P. O. Box 30991, Houston, Texas

Sales Representatives: Venezuela, Colombia, Peru, Bolivia, Ecuador, Panama, Perry & Hall, Australia, No. 364, Maracaibo, Venezuela, Argentina, Gibson, Sutcliff & Gell, Ltd., Scotland, Middle East, Address Inquiries for All Other Countries to P. O. Box 30991, Houston 1, Texas

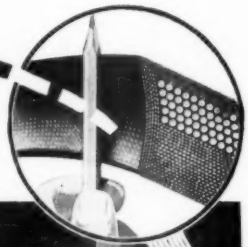


You can actually *feel* the sides of a belt *change shape* as the belt bends.

In Two Minutes You Can See Exactly How . . .

The Concave Side

(U.S. Patent No. 1813698)



SAVES Your Transmission DOLLARS

Take *any* V-belt in your hands and bend it as it bends in going around a pulley. You will see that the top of the belt, being under *tension*, grows *narrower*. The body, under compression, *widens*. The sides *bulge out*.

This shape change—in a *straight-sided* V-belt—is shown in Figures 1 and 1-A, below.

Straight-Sided V-Belt

How Straight-Sided V-Belt Bulges in Sheave-Groove.

Now look at Figures 2 and 2-A. There you see how the *same shape change* affects the V-belt built with the precisely engineered *Concave Side* (U.S. Patent No. 1813698).

Gates Vulco Rope with Concave Side.

No Side Bulge. Precise Fit in Sheave Groove.

The top of the belt narrows, the body widens. But the sides *merely straighten—and* the new shape *exactly fits* the sheave groove!

Two savings result. (1) Uniform side-wall wear *—longer life!* (2) Full side-wall grip on the pulley carries heavier loads and *sudden load increases* without slipping; saves belts, saves *power!*

The Mark of SPECIALIZED Research

The Concave Side is *MORE IMPORTANT NOW Than Ever Before*

Because the sides of a V-Belt are what actually drive the pulley, it is clear that any increased load on the belt means a heavier load that must be transmitted to the pulley directly through the belt's sidewalls.

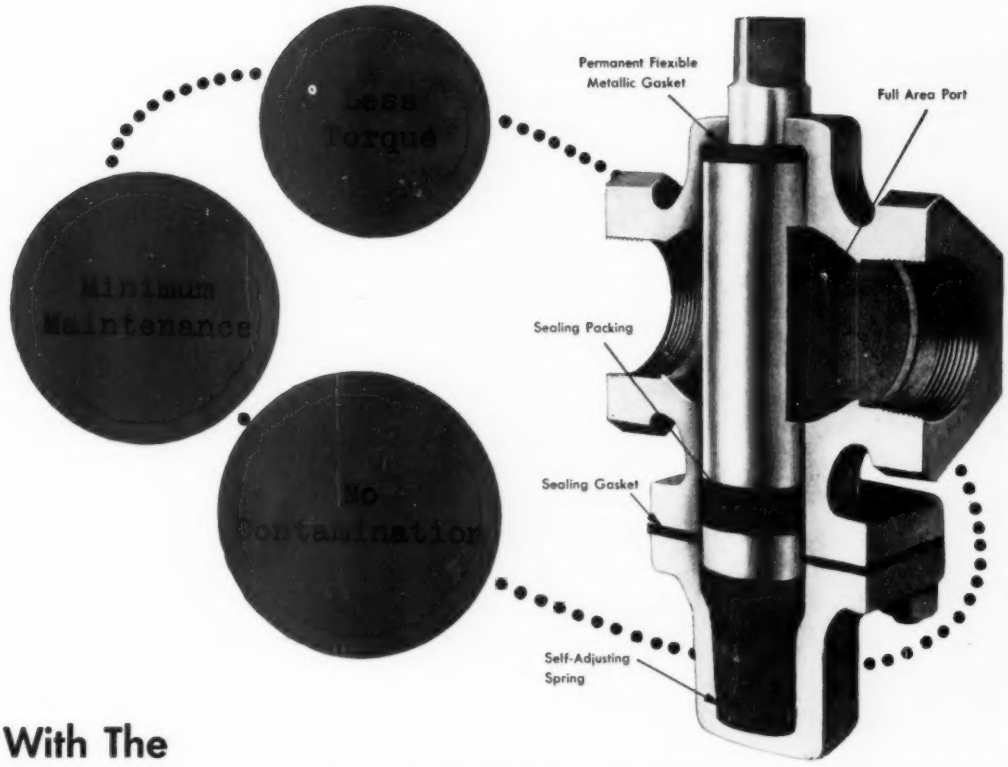
Now that Gates SPECIALIZED Research has made available to you SUPER Vulco Ropes—carrying fully 40% higher horsepower ratings—the life-prolonging Concave Side is naturally more important in conserving belt life today than ever before.

4910

GATES VULCO ROPE DRIVES

Engineering Offices and Jobber Stocks IN ALL INDUSTRIAL CENTERS of the U. S. and 71 Foreign Countries

THE GATES RUBBER COMPANY
DENVER, U.S.A.
The World's Largest Makers of V-Belts



With The

BELFIELD CYLINDRICAL PLUG VALVE

Here's the only non-lubricated valve with a parallel side. The Belfield Cylindrical Plug Valve utilizes a flexible metallic gasket for permanent sealing . . . lubrication is not necessary . . . parallel sides reduce torque to $\frac{1}{4}$ of tapered plug valves.

The result! The easily turned stem never freezes . . . leakage is no problem . . . there are no lubricants to contaminate the flowing medium . . . and maintenance is practically nil!

In addition, the Belfield Cylindrical Plug Valve can be equipped with electric or air motor for remote control . . . and the port can be designed to provide specified flow characteristics.

Call in your local Honeywell engineer for complete information . . . or write for a copy of Specification Sheet 402!

BELFIELD
WORLD'S LARGEST ORGANIZATION FOR ADVANCED INSTRUMENTATION AND CONTROL
MH MH
VALVES

MINNEAPOLIS-HONEYWELL REGULATOR CO.
BELFIELD VALVE DIVISION
Philadelphia 44, Pa.
Offices in 73 principal cities of the United States, Canada and throughout the world

MINNEAPOLIS Honeywell — *Diaphragm Valves* AND PROCESS CONTROL SPECIALTIES — Belfield VALVES

GMCs "Deliver the Goods"

Food, furniture and fuel oil . . . the tree, the turkey and the toys . . . almost everything that moves by motor truck makes its contribution toward a Merry Christmas.

Total truck tonnage has increased 120 percent in the past ten years and GMC has been a pacemaker in this rapid rise in truck transportation. Now better equipped to "deliver the goods" than ever before, tough, truck-built GMCs offer powerful, valve-in-head gasoline engines or famed, 2-cycle Diesel models . . . strong, sturdy chassis with rugged axles, springs and brakes . . . big, wide-vision, easy-riding cabs . . . outstanding performance and dependability, unexcelled efficiency and economy.

There's a better-built GMC for all hauling jobs . . . for every transportation task . . . Christmas time and all the time!

GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION

GMC
GASOLINE • DIESEL
TRUCKS

Hauling a portable drill rig or a load of pipe, GMCs are ideally suited for the tough jobs. The complete GMC line, ranging from Pickups to a gigantic Oil Field Special of more than 90,000 pounds GCW, provides trucks for every type of work in the oil and gas industries.

WHELAND
Duplex Slush Pump

...runs like a Whisper!

Noise and vibration mean unnecessary wear — needless upkeep and repairs. That's why the new Wheland HP-14000 slush pump has helical teeth—tool steel gears, one piece alloy connecting rods (no bolts), alloy steel heat treated crank cast in one piece including eccentrics, heavy duty anti-friction bearings and feather edged, rubber seal, free flowing valves. It runs like a whisper!

If you're interested in increasing drilling profits—visit your near-by Jones & Laughlin Supply store. See how reduced noise and vibration, rigid strength but light weight, and unprecedented accessibility of the HP-14000 Wheland Pump put money in your pocket that usually goes into maintenance.

Export: 230 Park Ave., New York 17, N. Y.
Wheland Export: Lucey Export Corporation, 233 Broadway, New York 7, N. Y., and Broad Street House, E. C. 2, London, England

- **New Spiral Gears**
  Reversible. Free from vibration—take less power.
- **Semi-Steel Fluid End**
  Cast steel available at extra cost.
- **Exclusive Tie Rod Construction**
  Rugged strength, minimum weight, maximum accessibility.
- **Toboggan Sole Plate**
  Easier to move—easier to load.

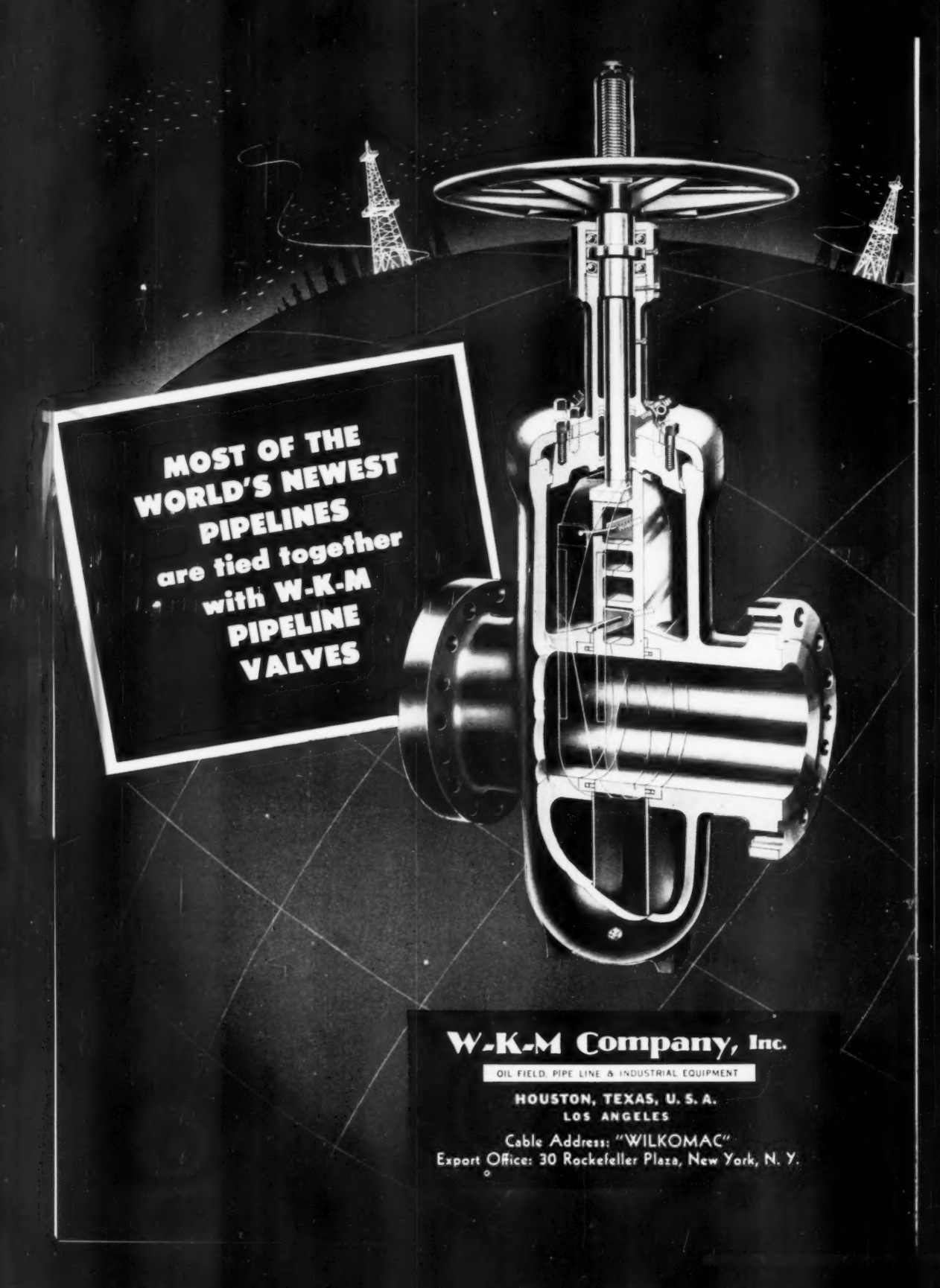
JONES & LAUGHLIN SUPPLY COMPANY

Subsidiary of Jones & Laughlin Steel Corporation

General Office

TULSA, OKLAHOMA

J&L STEEL



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OIL FIELD, PIPE LINE & INDUSTRIAL EQUIPMENT

HOUSTON, TEXAS, U. S. A.
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NEW HELPFUL GUIDE

to gas regulating problems

This new Airco Regulator catalog gives authentic, understandable information on the function and operating characteristics of regulators for the following types of service –

- for welding, cutting, heating, hardening and inert shielded arc welding.
- on cylinders, manifolds and pipe lines.
- for all types of compressed gases – oxygen, acetylene, nitrogen, hydrogen, helium, argon and other industrial gases.
- for use in the laboratory.
- dual stage regulation . . . single stage regulation – and a quick "reason why" one or the other type would give you desired uniform pressures, at less cost, for a particular job.

Everyone concerned with regulating gases under pressure will find use for this helpful catalog. It will save him time, effort and needless waste of money. It contains data regarding the proper regulator for any given type of job.

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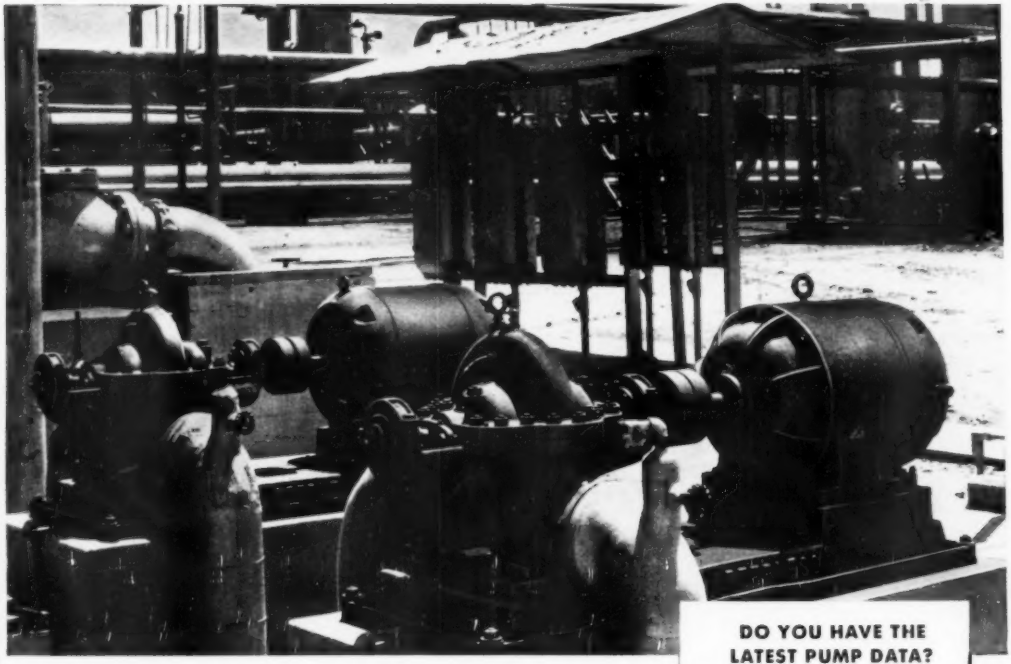
WHERE THERE'S A PUMP IN YOUR PLANS



Plan with Peerless Centrifugal Pumps

From plan to plant there's a Peerless horizontal centrifugal pump that meets your needs. For the diversified, continuous duty services of private industries and public projects, Peerless Pumps incorporate many proved advantages in design and construction for extended pump life and operative economy.

All along your flow lines, Peerless can provide pumps incorporating the latest principles of hydraulic practice and experience plus the versatility and efficiency you require for *peerless* pumping performance.

For example, the pumps shown above are single stage, double suction, general purpose Type A pumps, a comprehensive line of Peerless pumps offering a capacity range from 50 to 60,000 gpm. There are scores of other Peerless types, hundreds of other Peerless models for thousands of pumping applications. Peerless furnishes horizontals for handling solids in suspension as well as for clear liquids. There are pumps for boosting, circulating, transferring and filtering. They can handle volatile L-P Gases or tricky acid, basic and salt solutions. They can move liquids at high temperatures or they can provide water (or foam) for *Underwriters' approved* fire protection. Duty can be intermittent or continuous; both single and multi-stage units, with the type of drive you desire, are available, meeting widest head and capacity conditions. Pump and driver are engineered as a unit, tested in a modern hydraulic laboratory that duplicates actual field conditions, to match or exceed purchasers' expectations.

Plan with Peerless for all your needs for pumps. Peerless field and sales engineers are located in all principal cities to help you whenever and wherever there's a pump in your plans. For pump engineering information or service, call on them, or if you prefer, write for the latest pump engineering data. The chart at the right lists a number of the types of Peerless horizontal pump bulletins in which you will be interested.

DO YOU HAVE THE LATEST PUMP DATA?

Informative Engineering Bulletins Available From Peerless Pumps

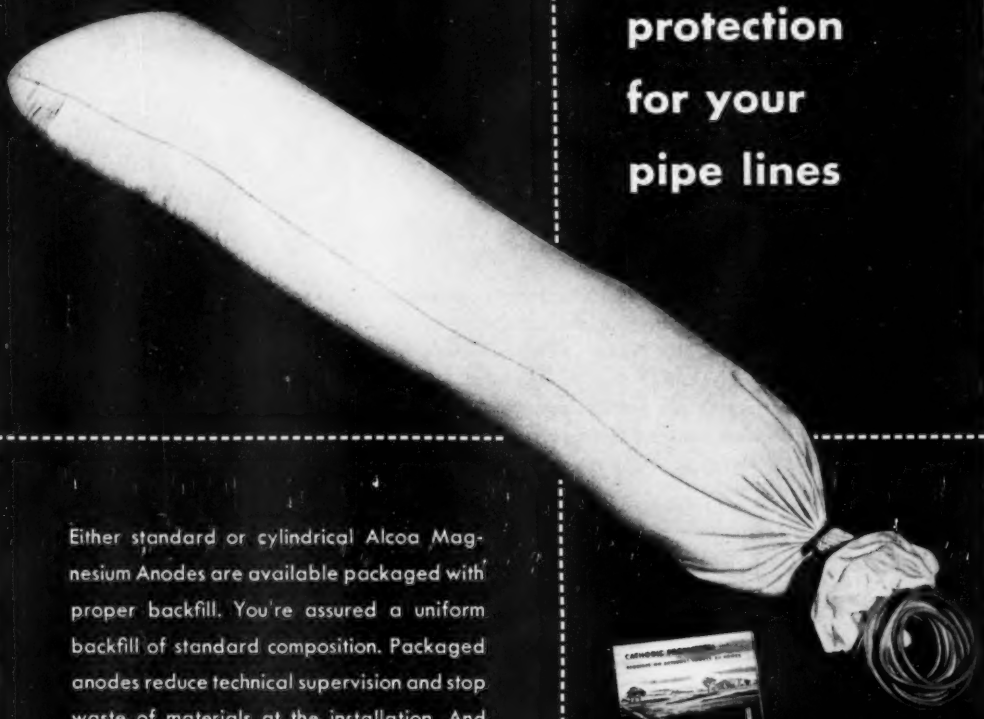
Here are a few of the services Peerless Pumps perform. Request data by Bulletin number.

Pump Service	Bulletin No.
Water Supply	B-1300
Fire Protection	B-1500
Chemicals and Oils	B-810
Vaporous Liquids	B-2201
Butane-Propane	B-2200
Boiler Feed	B-301
Sewage and Solids	B-154
Hi-Pressure	B-310
Acids and Caustics	D-2400
Process Services	B-803
All-purpose Pumps	B-2301

PEERLESS PUMP DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION
Los Angeles, California — Indianapolis, Indiana
District Offices: New York 5, 37 Wall St.; Chicago 40, 4554 N. Broadway; St. Louis 8, 3908 Olive St.; Atlanta Office: Rutland Bldg., Decatur, Ga.; Omaha, Nebr., 4330 Leavenworth St.; Dallas 1, Tex., 3905 Elm St.; Fresno, Calif.; Los Angeles 31, Calif.

Peerless
VERTICAL AND HORIZONTAL
Pumps

packaged protection for your pipe lines



Either standard or cylindrical Alcoa Magnesium Anodes are available packaged with proper backfill. You're assured a uniform backfill of standard composition. Packaged anodes reduce technical supervision and stop waste of materials at the installation. And you'll cut installation time . . . can install them easily in swampy or marshy ground.

Ask your nearby Alcoa sales office for copies of booklets to help explain Alcoa cathodic protection to all interested members of your organization. Or write to ALUMINUM COMPANY OF AMERICA, 625 Gulf Building, Pittsburgh 19, Pennsylvania.

***FREE BOOKLET* tells the simple story of Alcoa Pipe-line Protection**

In ten minutes reading time, Alcoa's new 8-page booklet tells the exceptional economy of an Alcoa buried anode system for pipe-line protection. Your nearby Alcoa sales office will gladly supply sufficient copies for your organization.

MAGNESIUM

ANODES by ALCOA

ALCOA
ALUMINUM

In Refineries, FLEXIBILITY COUNTS

GET POWER WITH

In oil refineries, where modernization programs frequently require shifting of equipment from place to place within the plant, drives with flexibility of application are a "must". This is one more reason why General Electric's STANDARD line of mechanical-drive turbines is winning such popularity in the petroleum industry. They can be easily transferred from one job to another, their speed and range changed easily, and their horsepower rating adjusted economically.

DP TURBINES PROVIDE FLEXIBILITY *THREE* WAYS

1. EASY TO RE-LOCATE

Shaft height is the same on all G-E standard single-stage turbines. This means that moving turbines from one job to another doesn't require a "custom line-up job." Not only shaft height, but size of coupling fit and keyways are standard on every unit.

DP turbines are quickly aligned, too. Unless casing temperatures are high, DP's can be lined up cold with the assurance that shaft lift will be within allowable limits when the turbines are heated. Such easy alignment is possible only on a center-line supported unit.

2. EASY TO ADJUST SPEED

By adjusting a simple handwheel, the speed setting can be varied within a 30% range. Once adjusted, the DP's hydraulic governor holds speed accurately.

If a change in application makes a new speed range necessary, the range can be set anywhere from 800 to 5000 rpm by simply substituting a new emergency governor and a new set of low-cost gears on the governor drive. These gears are standard, available on immediate delivery from the factory.

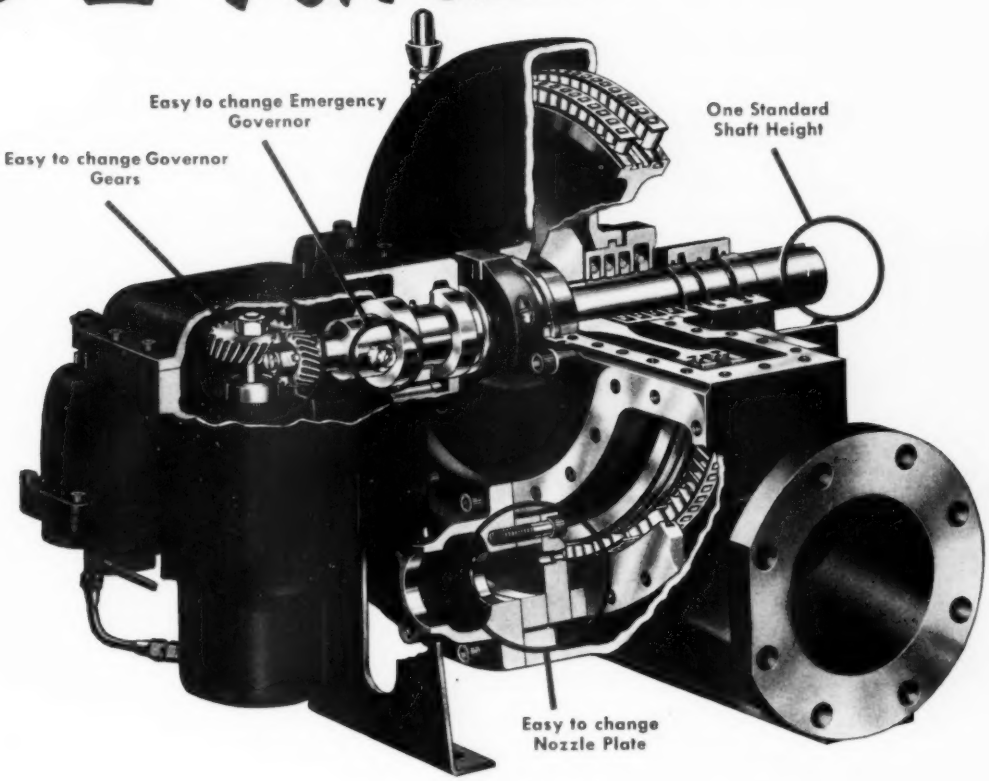
3. EASY TO CHANGE RATING

When steam conditions or load demands change, a DP turbine can be adapted at a reasonable cost for the new requirements if they are within the steam flow capacity of the casing. Example: If it is desired to increase the horsepower rating, the only changes which are usually necessary are new nozzle plate and valve parts. The cost of such parts is far less than the cost of a new turbine—which would be required with a less flexible unit.

REMEMBER...

"DP means Dependable Power"

FLEXIBILITY G-E TURBINES

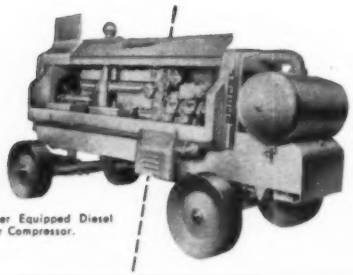


The General Electric standard DP Turbine incorporates many outstanding features previously found only on "special" turbines. They give you a drive which is dependable and flexible—ideal for application in the oil industry.

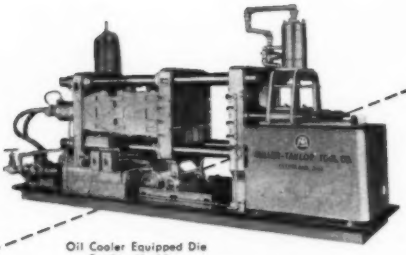
For the full story on how these features can mean operating benefits for you, call your G-E representative. Or write today for GEA-4955, a 20-page, descriptive bulletin. Apparatus Dept., General Electric Co., Schenectady 5, N. Y.

GENERAL ELECTRIC

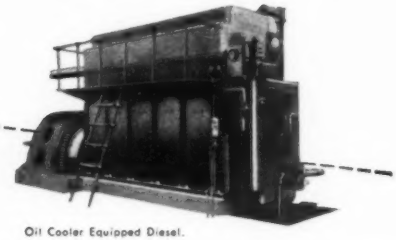
252-42



Oil Cooler Equipped Diesel Air Compressor.

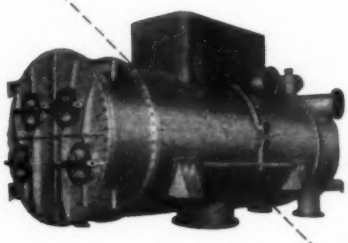


Oil Cooler Equipped Die Casting Machine.



Oil Cooler Equipped Diesel.

High Pressure Bleeder Heater.



Surface Condenser

IN STOCK UNITS OR HIGHLY SPECIALIZED DESIGNS

ROSS STANDARDIZATION

BRINGS TIME-SAVING, COST-SAVING BENEFITS

As both machinery manufacturers and users well know, Ross' complete standardization and mass production of smaller size exchangers enable the immediate shipment of many units from stock and the immediate assembly of many others from stocked parts. The net result is extensive use of Ross exchangers as original accessories by the Diesel, hydraulic machinery and like industries.

But the time-saving, cost-saving benefits of Ross standardization are not limited to size and type. Many apply to even the most specialized of custom-engineered exchangers. For having completely standardized and carefully classified all essential components of such larger, more complex equipment as power plant surface condensers, refinery heat exchangers*, high pressure bleeder heaters or mammoth fuel oil heaters . . . Ross can eliminate many of the engineering and fabricating costs and delays commonly associated with specially engineered units.

* Ross refinery type heat exchangers conform thermally and mechanically to standards of Tubular Exchanger Manufacturers Assn. of which Ross is a member.

ROSS EXCHANGERS . . . MAKE OTHER PRODUCTS BETTER

As part of your program for greater plantwide productivity, it would be to your advantage to be familiar with the full details of cost-reducing, time-reducing Ross standardization. Write.

ROSS HEATER & MFG. CO., INC., Division of American Radiator & Standard Sanitary Corp., 1417 West Ave., Buffalo 13, N. Y.

Serving home and industry

AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS • ROSS HEATER • TONAWANDA IRON

To the man whose business it is to keep operating conditions up to par

Investigate the Valve Operator with THRUST Controlled Seating

The principle of the unique Thrust Controlled Seating of C-H TNY operators

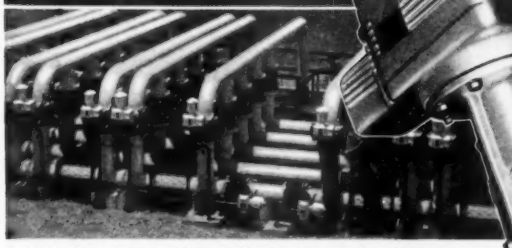
During seating movement, Fulcrum is at A (above) and drive is *down*, toward the valve seat. At moment of tight seating, Fulcrum *transfers* to B (below) and further drive is *upward*, absorbed harmlessly by the springs.

Any movement toward progress in the Oil and Gas Industry will sooner or later bring your attention to the Cutler-Hammer TNY Valve Operator. It is the only valve operator with the principle of THRUST controlled seating . . . hence the only valve operator that can seat a valve *positively, accurately, safely, surely* . . . without necessity of manual attention or back-off . . . without danger of jammed, frozen or inoperative valves.

With this exclusive feature, the motor *positively* drives the valve disc home. During the driving period, the fulcrum is established at the yoke nut by heavy steel springs which exactly balance *tight seat pressure*. Therefore, at the very instant of desired tight seating, the driving fulcrum transfers to the seat of the valve, and any further drive is into the heavy springs themselves which trip the THRUST switch and harmlessly absorb motor drift.

The amazing part is that the same degree of tight seating is maintained no matter how much valve parts may expand or contract. No other valve operator has or can have this direct Thrust Controlled feature. No other valve operator can be as safe and sure and accurate. CUTLER-HAMMER, Inc., 1453 St. Paul Avenue, Milwaukee 1, Wisconsin.

For better pipe line valve performance use Experience-Engineered valve control



Cutler-Hammer entered the field of valve control in 1900. Its modern designs therefore reflect a "know-how" without a peer.

CUTLER-HAMMER
VALVE CONTROL
C-H

Experience-engineering makes Cutler-Hammer Valve Operators the logical first choice in the pipe line field.

At river crossings, pumping stations and terminals, C-H Operators speed operations, safeguard equipment, expedite materials flow.

The exclusive C-H controlled THRUST seating principle is successfully applied in sizes up to 80 tons *THRUST*, or down to a few lbs., as required.

Snap-on Roughneck Set

A Special Oil Field Tool Kit

Here's What You Get:

MIDGET SET, 1/4" Square Drive
4 handles, 2 extensions
3 Sq. Sockets, 1/4" to 3/8"
8 Hex. Sockets, 3/16" to 7/16"

MASTER SET, 1 2" Square Drive
4 handles, 3 extensions
15 Hex. Sockets in tray, 7/16" to 1-1/4"

HEAVY DUTY SET, 3 4" Sq. Drive
7 Handles and extensions
12 Double broach Hex. Sockets 1-5/16" to 2-1/8"

11 BOXOCKET WRENCHES
(double offset)
Sizes 7/16" to 1-5/8"

5 OPEN END WRENCHES
(double end)
Sizes 25/32" to 1-1/2"

8 COMBINATION WRENCHES
(short handle)
Sizes 5/16" to 3/4"

7 COMBINATION WRENCHES
(long handle)
Sizes 13/16" to 1-1/4"

MISCELLANEOUS WRENCHES
2 adjustables, 2 pipe wrenches
1 vise-grip, 7 Hex. Head Wrenches 5/16" to 3/4"

3 PLIERS
Cutter, Heavy Duty, Lineman

2 BALL PIEN HAMMERS
12 oz. and 2-1/2 pound

SCREW DRIVERS
4", 8", 18" blades
9-1/2" screw starter

PUNCHES AND CHISELS
3 starter punches, 4 flat chisels

FILES
2 Mill Bastards, 1 Half Round Bastard
2 Round Bastards, 5 file handles

MISCELLANEOUS
Tinner Snips, Steel Tape Rule
16" Pry Bar, Tool Chest, Tote Tray
Hack Saw Frame—10 blades

131 TOOLS

... personally selected by oil field men for all types of service, repair, and maintenance work.

Having correct and adequate wrench equipment immediately available is valuable insurance against loss of time resulting from breakdowns on the job . . . and this "Roughneck Set" provides that insurance.

Here in one complete kit of tools is everything you need to handle accessory installation to tearing down a diesel. There's a "right" tool for every job! Put this set to work on the job and cut repair time to a minimum with tools that are "The Choice of Better Mechanics."

SNAP-ON-TOOLS CORPORATION
Oil Field Division
8098-L 28th Ave., Kenosha, Wis.

They Say—

From the Standard Oiler, Standard Oil Co. of California.

Cooperative Problem

"The oil industry, as well as the automotive industry, spends millions in research. Through experience and experiment we are constantly making new discoveries about our products and their application. But how can we give the owner the full benefits of these findings if we are brought into the picture only after the lubrication recommendations have been written? Why aren't we given the opportunity, in the development period, of pooling our knowledge and research with that of the automotive industry?

"Without going into detail, it would seem to me that the functions of a working partnership should include:

"1. Cooperation in the design stage of new units in order that the lubrication recommendations may reflect the combined knowledge and experience of both industries.

"2. A study of existing lubrication recommendations and instructions with a view to eliminating inconsistencies, promoting uniformity in nomenclature and reducing the number and types of lubricants required to service all models.

"3. Cooperative study and discussion of such subjects as the crankcase drain interval and the interval of chassis lubrication."

Ray Shaw, president, Chek-Chart Corp., Chicago, in the Oil and Automotive Jobber.

Stickage Factor

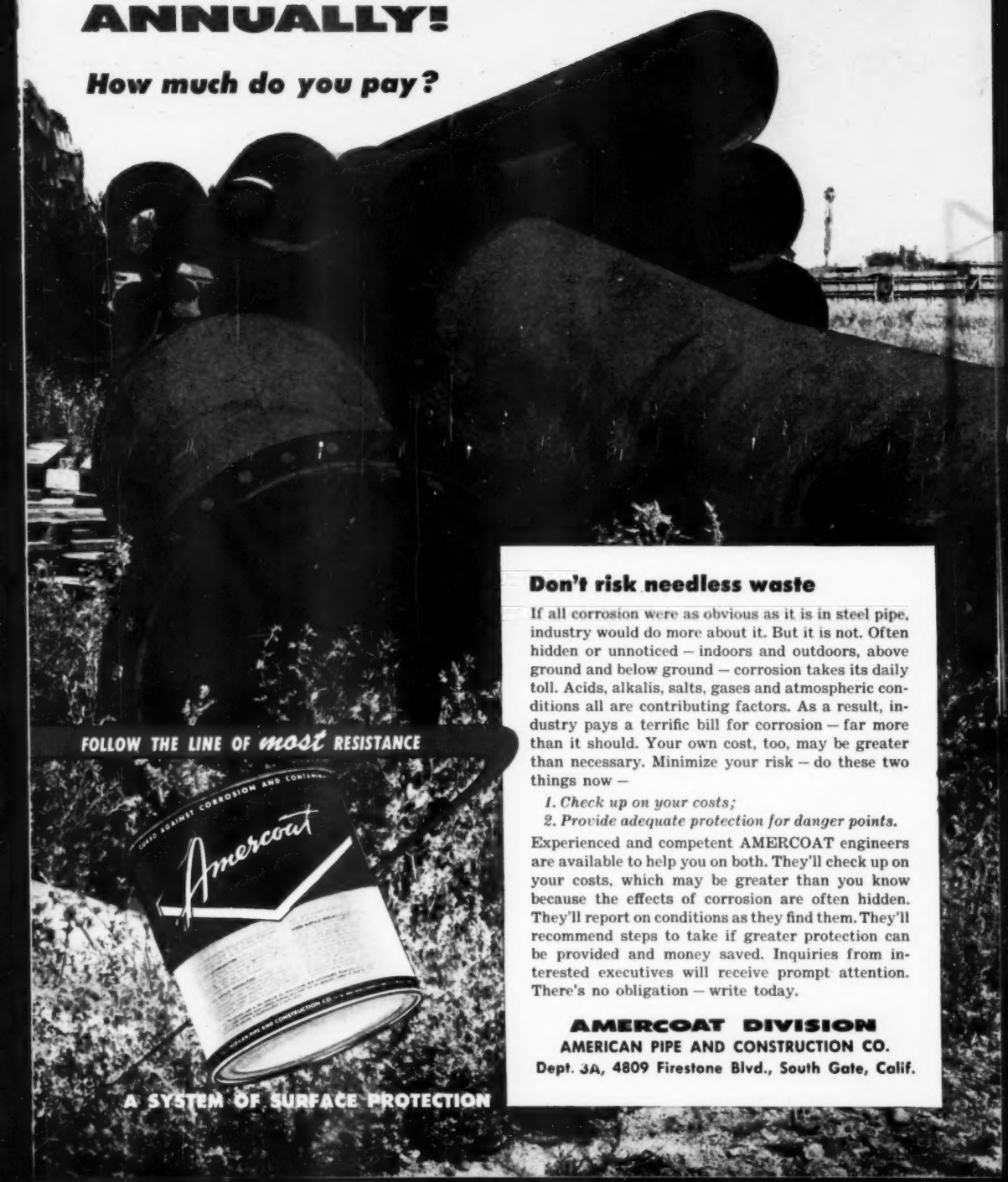
Most people think a quart can of motor oil contains one quart. A can of Sohio motor oil contains slightly more than what the label says. This is to allow for a certain amount of oil sticking to the sides of the can when it is poured into your engine. Long ago our company conducted extensive tests of this "stickage factor" and found that it ranged between ½ and 4 per cent for the various sizes of containers. We also found out that

CORROSION COSTS INDUSTRY

$6,000,000,000.00

ANNUALLY!

How much do you pay?



FOLLOW THE LINE OF *most* RESISTANCE

A SYSTEM OF SURFACE PROTECTION

Don't risk needless waste

If all corrosion were as obvious as it is in steel pipe, industry would do more about it. But it is not. Often hidden or unnoticed – indoors and outdoors, above ground and below ground – corrosion takes its daily toll. Acids, alkalis, salts, gases and atmospheric conditions all are contributing factors. As a result, industry pays a terrific bill for corrosion – far more than it should. Your own cost, too, may be greater than necessary. Minimize your risk – do these two things now –

1. Check up on your costs;

2. Provide adequate protection for danger points.

Experienced and competent AMERCOAT engineers are available to help you on both. They'll check up on your costs, which may be greater than you know because the effects of corrosion are often hidden. They'll report on conditions as they find them. They'll recommend steps to take if greater protection can be provided and money saved. Inquiries from interested executives will receive prompt attention. There's no obligation – write today.

AMERCOAT DIVISION
AMERICAN PIPE AND CONSTRUCTION CO.
Dept. 3A, 4809 Firestone Blvd., South Gate, Calif.

Get Rock Bottom Maintenance!

KEROTEST

KEROTEST *trouble-free* STEEL VALVES

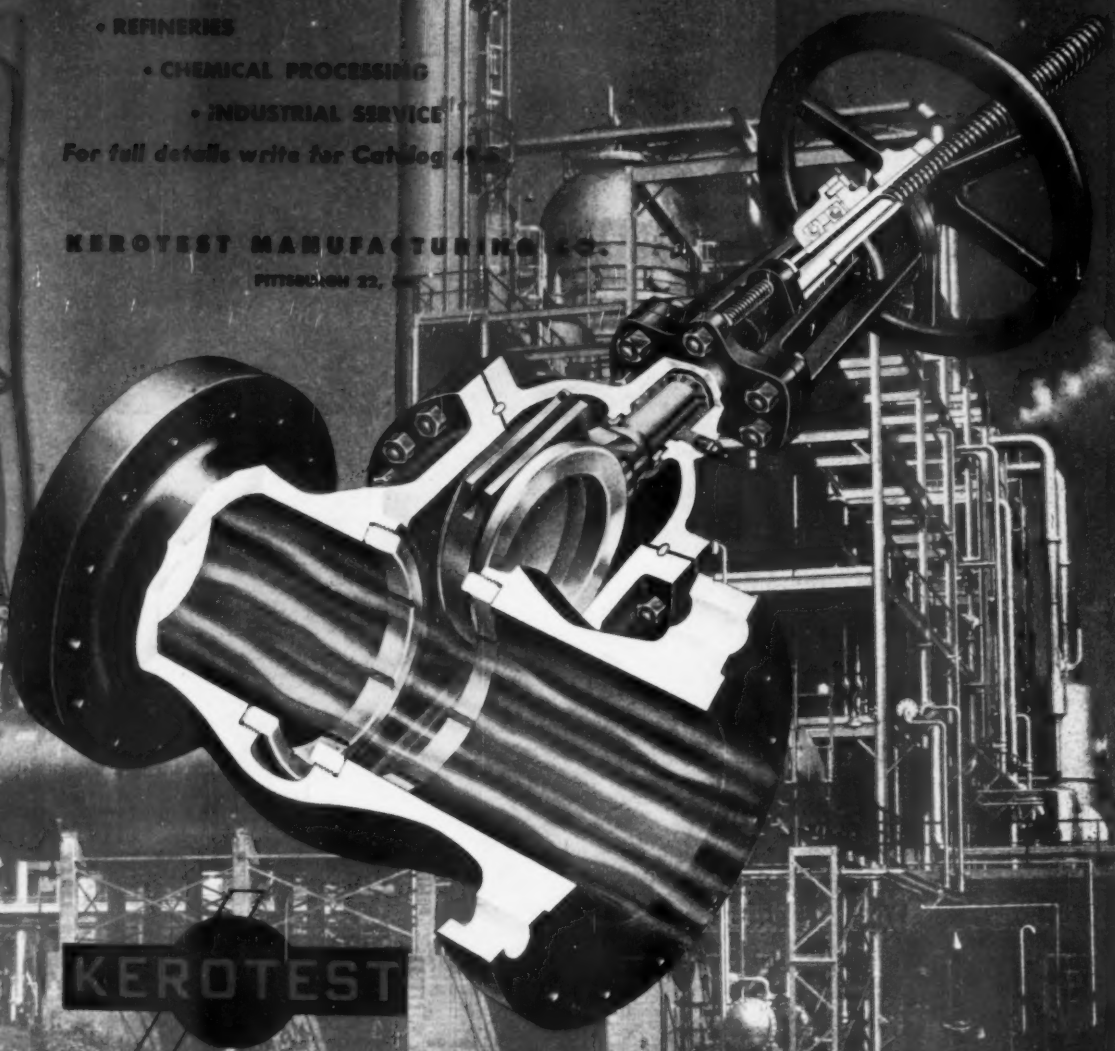
Cast Carbon and Alloy Steel Valves for:

- REFINERIES
- CHEMICAL PROCESSING
- INDUSTRIAL SERVICE

For full details write for Catalog 41-B

KEROTEST MANUFACTURING CO.

PITTSBURGH 22, PA.



KEROTEST

America's First Name in Quality Valves . . .

the increase in temperature after the can leaves the factory may expand the oil in the can as much as 5 per cent. So the cans had to be designed to hold more than their labeled volume. A quart can, for example, is really a 1.07 quart can. Since about 2 per cent sticks to the sides, Sohio puts 1.02 quarts into it to insure that the customer gets at least a quart.

The Sohioan, Standard Oil Co. of Ohio.

Petrochemicals

"Well, you can hardly talk about industry, or at least about chemistry, in this day and age without talking about petroleum. Petroleum refining has developed over the years from an oil boiling art to a highly technical and exceedingly complex science. As a result, numerous byproduct hydrocarbons have become available for further processing as chemical raw materials, and competent Western research has led to large-scale chemical manufacture by the petroleum industry."

Leland I. Doan, president, Dow Chemical Co., speaking in San Francisco.

Hoarding of Resources

"Motor transport is an American servant. Like aviation it is on the upgrade, still developing with as much vigor as it did two decades ago. Who knows what this industry will be a dozen years hence? . . .

"To expose the 'absurdity' of the hoarding theory of conservation, H. G. Meador, vice president of Gulf Oil Corp., suggested consideration of what would have happened had motoring needs and developments been frozen at the level of the 1930's. Imagine the productive capacities of the petroleum, auto, steel, and rubber industries had they been denied the normal expansion that comes with development of newer and better machines and consequent increasing demand."

Less Allman, vice president, Fruehauf Trailer Co., addressing Indiana oil marketers.

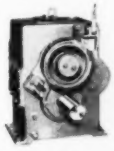
Cost of Offshore Lines

"The California Co. has laid to date, in the Gulf of Mexico, three 4-in. lines with a total length of 47,900 ft., and eight 2-in. lines with a total length of 23,800 ft. These lines are operating satisfactorily but it is realized that there are many problems yet to be solved and better solutions obtained to those already encountered. The major problems appear to be: More economy in installation, properly anchoring or marking the lines to prevent damage, corrosion control, repairing underwater damage, and correct type of scrapers to be used.

"More economies in the installations of the lines can no doubt be

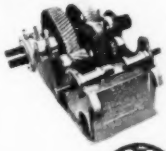
RIGHT GEARS SAVE DOLLARS

Are you sure your equipment doesn't include *even one* inefficient belt, chain, or gear drive? Just one can cost you needless dollars



...IN DRILLING

New, special Pacific-Western transmissions are now available to reduce power and time costs.



...IN PUMPING

Pacific-Western speed reducers designed especially for oil field service save maintenance dollars.

...IN STRIPPING

Operating costs on old wells can be cut to the absolute minimum by installing Pacific-Western bandwheel drives.

...IN PIPELINE SERVICE

A complete line of Pacific-Western high-speed units is available for reliable service on pipelines.

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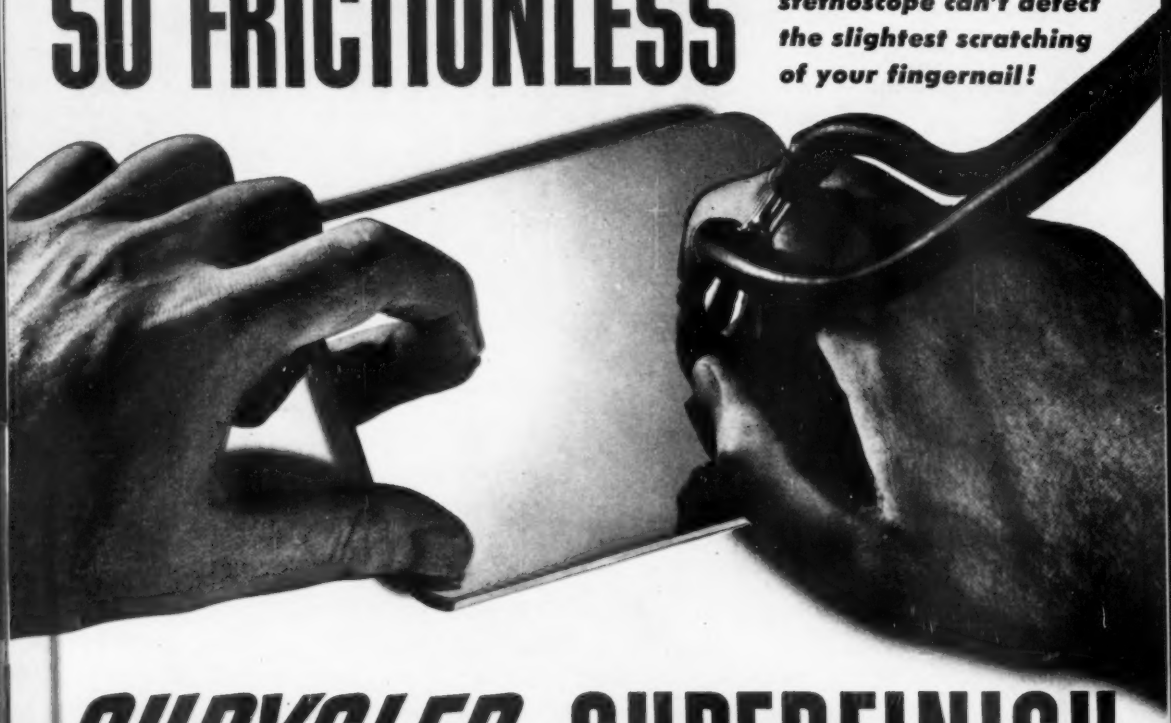

CHRYSLER SUPERFINISH

. . . the Chrysler-developed method of surface finishing vital engine parts, *comes closer to eliminating friction and wear than any finishing method ever devised!*

Superfinishing removes the surface roughness left by machining. It produces an almost unbelievable mirror smoothness—far beyond the limits of grinding, honing or lapping. What is left is actually *polished base metal.*

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CHRYSLER

Industrial Engines and Power Units

HORSEPOWER *WITH A PEDIGREE*

achieved. This is evidenced by the fact that costs have been reduced on the last lines by 20 per cent on the 4-in. and by 45 per cent on the 2-in. but these costs are still approximately four times that of laying comparable lines in the marshes. It should be mentioned that a large part of the cost on any line in shallow water is due to the burying required by the U. S. Engineers. Until the burying problem in shallow waters is further improved costs will probably remain high."

H. E. Denzler, Jr., addressing A.I.M.E. meeting in San Antonio.

Cylindrical Furnaces

"The use of cylindrical furnaces for the petroleum industry has steadily increased since the advent of the original cylindrical furnace invented by Luis de Florez for refinery use some 20 years ago. . . .

"The cylindrical furnace has been successfully used for many duties such as crude topping, heating reduced crude for vacuum distillation to produce lubricating oils and asphalts, light and heavy gas-oil cracking, evaporating and superheating oil vapors for the Houdry and Thermofor catalytic cracking processes, heating up lube oils and solvents, heating up fat absorption oil for casing-head production, high and low temperature steam superheating, heating asphalts for loading purposes, domestic heating, and many other uses. The future offers still greater development and use because of its simplicity and flexibility."

O. F. Campbell, Sinclair Refining Co., addressing A.S.M.E. meeting, San Francisco.

Gasoline Price Threat

"The present level of gasoline inventories and the expected seasonal buildup which will occur in these indicates that considerable pressure on the wholesale gasoline price structure will occur in coming months and may be described as almost intense by the time gasoline stocks reach their peak next spring."

Report of oil and natural-gas securities committee of the Investment Bankers Association.

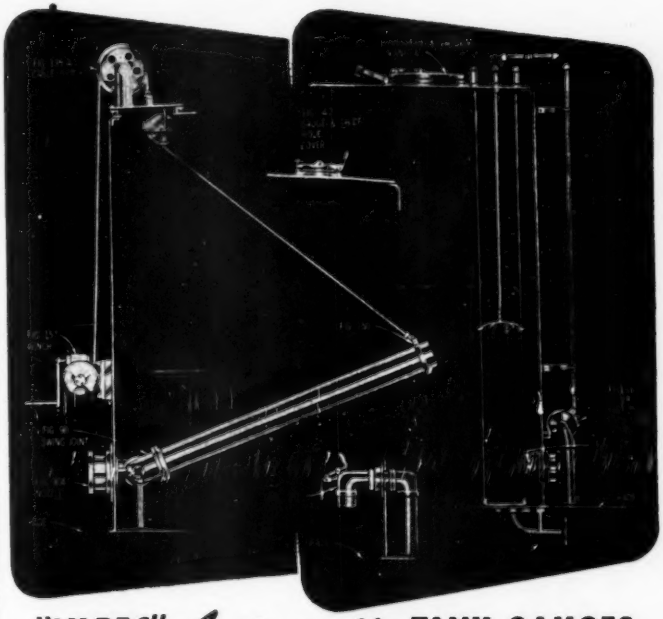
Tomorrow's Auto

"Although today's automobiles are the best ever built, tomorrow's will be far superior. While the car of 1959 may not be powered by atomic energy, it is quite likely to have under its hood a small, simple and extremely economical gas turbine. In any event, it will be as far ahead of the car you are now driving as this year's models are ahead of the cars of 1934."

George T. Christopher, president, Packard Motor Car Co., writing in American Magazine.

ACCURATE and RELIABLE

TANK ACCESSORIES
for *Convenient* Operation



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Designed for all types of tanks and corrosive conditions, VAREC Automatic Tank Gauges afford you a safe, accurate, economical means of measuring liquid levels . . . conveniently, and as often as necessary. Gauges operate on a float actuated tape; give reliable readings in an eye-level lookbox outside the tank.

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When increased production is a must . . . or when new equipment is installed, Preformed wire rope offers definite advantages. Here's why:
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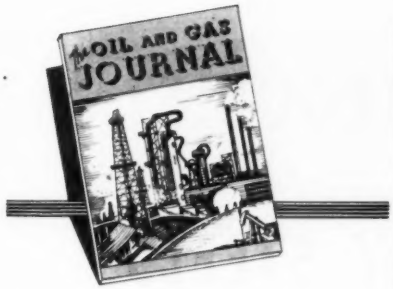

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JOURNALLY Speaking

White on Black

OUR editors get quite a few compliments on our weekly four-page section of charts and statistics. Recently a grateful reader said he particularly liked our charts because they are so simple, and the white lines on black backgrounds are so easy to see.

That's fine, but he didn't know the real reason we do it that way. If we used fancy charts with a lot of lines, particularly in two or three colors, our artist would have to redraw each one and a new engraving would have to be made every week, and this would take so much time that we wouldn't be able to get in the very latest figures that are available just before press time.

So we use "reverse" cuts which print solid black. Just before deadline each week the engraver routs another little jog in the grooves (which print white) and there's the current week's trend as neat as you please. By that little time-saving trick we are able to get to you "fustest with the mostest" in the way of a quick picture of the oil industry's economic situation this week. (Saves money, too).

Unknown Benefactor

THE Journal has a staff of two dozen full-time editors located at strategic points plus a lot of part-time correspondents at other places, all on the que vive for news items about our favorite industry and the people who make it.

But even so a few nuggets of news would slip between our combined fingers occasionally if it were not for voluntary assists from helpful readers who send in items we might otherwise miss. To all such we extend thanks, but we are particularly grateful to an unknown benefactor.

Virtually every week our Personals Editor gets an envelope, always addressed in the same handwriting and bearing the imprint of a club in a prominent southwestern oil city. Inside the envelope there is never anything except a few newspaper clippings about oil men, usually those who have run their last barrel of oil and passed on to their final reward. Though this anonymous contributor's interest is chiefly in the necrology of the industry, we greatly appreciate his uncompensated assistance and we wish we had more readers who believe it is more blessed to give than to receive news.

Stretching Things

OUR usually meticulous refining editor must have been carried away by a pep talk from some local booster when he wrote about The Texas Co.'s Eagle Point refinery in last week's issue and said: "The New Jersey-Delaware Bay region now has refining capacity almost equal to that of the Gulf Coast."

A sharpshooting critic hereabouts dug up figures to prove that while his statement might be true of some section of the Gulf Coast, the refining capacity of the eastern region is only about 40 per cent of the entire Gulf Coast area. It would seem that it ought to be at least 51 per cent as big before even a chamber of commerce publicity agent could make a claim to being "almost equal."

Duck Soap

THE oil industry gets blamed for all water pollution everywhere, no matter what the actual source. Reporting on this at one of the A.P.I. committee meetings, a speaker read several newspaper accounts of ducks lighting on oil-covered ponds and being unable to take off. In a number of cases local citizens had caught the ducks and tried to clean off the oil with kerosine, which usually proved fatal to the ducks. Since the industry gets blamed for this, he said, it might be good public relations to set up a research project and devise an official shampoo for oily ducks.

—*Henry D. Ralph*

You Can Save

TIME...MONEY...TROUBLE

with

CAST NICKEL ALLOY STEELS

A fundamental difference exists between alloy steel castings and those of plain carbon steel . . .

The *unmatched combination* of properties available in nickel alloy steels, cast to shape, assures superior performance, greater dependability and lower ultimate cost.

MEET EXACTING REQUIREMENTS

Engineering requirements often call for castings with properties that are attainable only by heat treatment. Since castings are generally complex shapes and frequently vary in section thickness, simple normalizing treatments are often practiced. When quenching and tempering are necessary, substantial economies can result from using steels that adequately resist the tendency to warp and crack.

RESPONSE TO HEAT TREATMENT

Cast nickel alloy steels provide basic advantages for fabricator and user, alike. Well beyond the reach of carbon steels are the combinations of strength or hardness and toughness which can be obtained in nickel steel castings by simple normalizing. Their response to mild quenching avoids distortion and cracking, thus permitting the attainment of high strength with adequate ductility in large, cumbersome sections. This simply can't be done with carbon steels.

CONTROLLED IMPROVEMENT

Nickel additions permit controlled improvement of desired properties in steel. Such control has resulted in use of cast nickel steels in main frames for steam locomotives since the early part of this century. High toughness . . . and strength along with ductility . . . are primary requisites in railroad service. Significantly, railroads now are the largest tonnage users of nickel alloy steel castings.

ADVANTAGES OFFERED

Extensive use in oil production, hydroelectric plants, steel rolling and forging, mining, milling, smelting and other heavy industries indicates growing recognition of the following advantages offered by alloy over plain carbon steel castings:

- **Stronger . . . higher yield strength**
- **Less bulk and deadweight**
- **Harder . . . more wear resistant**
- **Better response to heat treatment**
- **Greater shock-resistance**
- **Greater fatigue strength**
- **Less embrittlement at sub-zero temperatures**

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VOL. 48, NO. 32 DECEMBER 15, 1949

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In This Issue

News

Snyder, Tex., Termed World's Most Active Oil Center 41
N.G.A.A. Meeting Devoted to Gas Field-Processing Methods 42
"Hydrafrac" Process Increases Production 65 Per Cent in 131 Wells 42
Transcontinental Lets Contracts for 734.5 Miles of Gas Line 43
Cities Service to Close Lube Plants at Ponca City, Titusville 44
Louisiana Committee Sees No Need to Change Conservation Setup 44
Compact Sets Policies for Coming Year 45
Crude Imports in October Set Record for Year 46
Increase in Crude-Oil Stocks Not as Big as Announced 47
Peoples Gas Light & Coke Co. Planning "Largest" Gas Line 47
Urey Suggests That Radioactivity Gave Earth Its Present Form 49
Union Oil Head Answers Critics of Oil Industry on Smog 50
Esso Building More Storage Facilities 51
Pipe-Line Developments in the Middle East 52
Deeper Drilling, More Exploratory Work Planned in Trinidad 54

Engineering-Operating

Severe Dust Storms Major Drilling Problem at Lost Hills 62
Pressure Surge Tests on Oil Pipe Lines 64
World's Largest Power-Rig Drilling Barge Making Hole 69
Influence of Oil in Subsurface Corrosion of Equipment 73
Improved Casing Cementing 76
Producing Leases by Gas Lift 82
Cit-Con Lube Plant One of World's Most Modern 86
Increasing Production of West Coast Wells 88
Cost-imating—A Refinery Cost Index 91
Questions on Technology 95
Oil and Gas Equipment Digest 97

Exploration-Development

Town-Lot Drilling Looms in Wyoming 123
Highlights in Week's Developments 123
Reports by Areas Start on Page 124

Departments

They Say 28
Journally Speaking 35
Editorial 39
This Week 40
Watching Washington 48
International News 52
Personals 58
Deaths in the Industry 61
Pipe-Line News 101
Pipe-Line Construction 105
Drilling Contractors 115
Natural-Gas News 119
Refining News 120
Exploration Statistics 142
Production Statistics 143
Refining Statistics 144
Market Statistics 145
Equipment Men in News 147
Classified Advertising 149
Calendar of Events 152
Advertisers' Index 152

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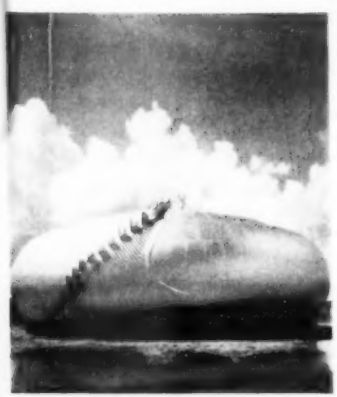

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Crude Oil, Natural Gasoline and Liquefied Petroleum Products

Cit-Con

LAKE CHARLES, La.—The dedication of the Cit-Con Oil Corp.'s large lubricating-oil plant was significant to us in several respects.

There was the fact that F. M. Simpson, as vice president and general manager of this $42,000,000 enterprise, presided as master of ceremonies. Not too long ago Jerry Simpson was a junior engineer in the Cities Service organization. Starting at the bottom, through a series of promotions he now heads a multiprocessing operation incorporating the latest features in design, including an amazing application of automatic control.

Simpson would be the last to take undue credit for an operation which essentially is the result of joint contributions of two refining organizations, along with those of the engineering and construction firms, all manned with key men having training and experience similar to his. Our thought here is that opportunity is not dead in this industry—in fact it never was better for those who are willing to work and accept responsibilities.

Then there was the observation of U. S. Sen. Russell B. Long, who made his own calculation that for every operating employe of Cit-Con there is an investment by his employer of $180,000. He compared this with the average investment in many other Louisiana enterprises of less than $1,000. The youthful senator sensed that the 200-million-dollar investment in petroleum refining and allied activities in this immediate area over the past 10 years has been a major contribution to the industrial life of his state and accounts for improvement in wages and standards of living.

It was explained that as a joint enterprise of the Cities Service and Continental companies there were savings in both construction and operating costs of Cit-Con. But each company will do the final blending and compounding of the several base products.

Regarding this, Continental's McCollum said: "I want to emphasize that this partnership begins and ends at this jointly owned plant. Outside these gates we cease to be partners and competition really begins."

This should answer those who profess to be fearful as to the ultimate end of an increasing number of joint enterprises within the oil and natural-gas industry. As regards public policy the consumer benefits through the lower costs and improved quality and at the same time loses none of the advantage of keen competition in distribution.

Finally, Cities Service's Jones stressed the broader aspects of Cit-Con. This veteran executive and observer could not associate such as enterprise with the social planners who now dominate economies of many other lands. Said he in conclusion: "We should dedicate ourselves to preserving the institutions which have not only made this plant possible but have also made possible the high standards of living which we enjoy and which are the envy and the amazement of the rest of the world."

THIS WEEK

ECONOMICS—Penn Grade crude prices take a jump after months in the doldrums. . . . ¶Esso Standard concludes more storage is answer to problem of winter peak demands. . . . ¶Apparent drop in crude stocks called deceptive. . . . ¶Imports, still climbing, reached a new high of 778,710 bbl. daily in October. . . .

INDUSTRY AFFAIRS—Oil-state officials make vigorous defense of market-demand proration. . . . Say critics are wrong. . . . Insist statutes are legal and promote conservation. . . . ¶Local smog conditions in several refining areas bring threats to close down refineries. . . . Federal Government asked to intervene. . . . Poses new public-relations problem for oil industry. . . .

TRENDS—Refinery demand for the four major products in the 4-week period ended December 3 was about 5.5 per cent greater than in the same period last year. . . . Gasoline was up 6.5 per cent. . . . ¶Major product stocks decreased 3,734,000 bbl. for week ended December 3 compared with an increase of 4,181,000 bbl. in same week last year. . . .

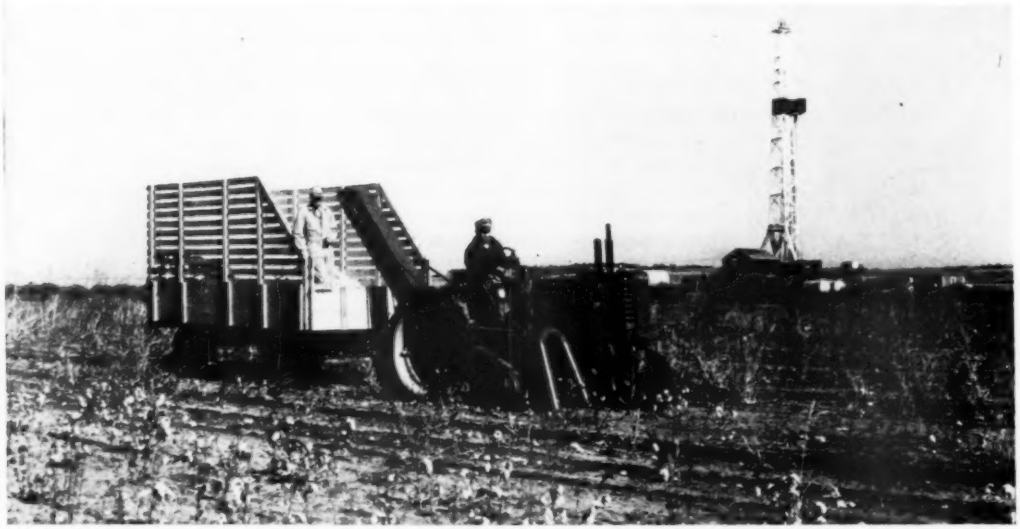
BOOM AREA—Every report from Scurry County makes West Texas reef production look more important. . . . Fields are joining up, and even conservative estimates call it the biggest find since East Texas. . . . Drilling rigs are scarce in Scurry, and leasing and financing activity are at a dizzy pace. . . .

INTERNATIONAL—Middle East oil expansion may be slowing down. . . . One big pipe-line project has been abandoned for economic reasons. . . . Two other lines are being delayed by political complications. . . . But the new Iraq outlet will be completed ahead of schedule. . . . ¶Prediction made that newcomers in the Middle East will be under severe handicaps of high royalties and few markets. . . . ¶Trinidad's production is headed downward unless new reserves can be found. . . . Operators ponder more exploration, deeper drilling, offshore development. . . .

PEAKS—Number of rotary rigs operating hit a new peak for the year at 2,253 the week ended December 5, up 26 from the previous week. . . . This accentuates a trend which 6 weeks ago reversed a gradual decline of many months. . . . ¶Well completions totaling 835 the week ended December 10 set a new record for the year. . . .

PIPE LINES—Magnolia will build 25-mile crude line to give outlet for new Pegasus field of Midland-Upton counties, Texas. . . . ¶Humble begins work on 371-mile, 18-in. line to take West Texas crude to Houston. . . . Mid-Valley company's 1,000-mile East Texas-Ohio crude line is now across the Mississippi River. . . .

NATURAL GAS—First Gulf Coast gas slated for Chicago. . . . New 1,400-mile, 30-in. pipe-line project merges reserves of Gulf Coast Northern with market of Peoples Gas Light companies. . . . Also assures gas supply for projected line to Virginia and the Carolinas. . . . ¶Transcontinental's "superlatives" line making rapid progress while application pends to boost its gas deliveries to the East. . . . ¶New entrant appears in the race to bring natural gas to New England. . . .



THE FLURRY IN SCURRY (see SOUTHWEST) has not disturbed the equilibrium of the shrewd West Texas farmers. Instead of spending their royalty checks for gold-plated bathtubs and city bright lights, they view their oil as a crop and use the proceeds to improve their lands. This Scurry County farmer is completing his cotton harvest with a new stripper, bought with profits from the oil well in the middle of his field

Busiest Oil Center

Snyder paves its courthouse lawn to make more parking space; 200 drilling rigs expected to be operating by March

D. H. Stormont

SNYDER, Tex.—Constantly increasing drilling in Scurry County's reef oil fields serves to strengthen this area's claim as the world's most active oil center. It likewise serves to make this teeming city the nation's number-one oil boomtown; Snyder already is bursting at the seams because of its quadrupled population, but the influx of oil-field personnel continues.

Last week there were about 120 rigs at work in Scurry's reef fields of North Snyder, Kelly, Diamond-M, and Sharon Ridge (Canyon). In addition some 15 rigs were seeking to extend the field's productive limits or find other reef fields or deeper limestone pays. This number represents an increase of about 50 rigs in the past 2 months; the total may reach 200 within the next 3 months, many observers feel. Because of the reef activity, one operator stated it is becoming hard to find a rig in West Texas which is suitable for the 7,000-ft. drilling.

Prime reason for the rapid growth in drilling activity, of course, is the thick prolific pay section found at the relatively shallow depth of 6,700-6,900 ft. While in some producers only a relatively few feet of reef are cut, in the majority of producers from 100 ft. to more than 700 ft. of pay section is drilled. For the area as a whole about 50 per cent of the section is oil productive.

Other factors affecting the rate of drilling are the large number of operators and the relatively small size, by West Texas standards, of the individual blocks. Thus as one well is completed it often forces the immediate drilling of three offset wells by other operators.

Biggest since East Texas.—There is little doubt in the minds of most geologists that North Snyder, Kelly, and Diamond-M will connect to give a field some 18 miles long and up to 5 miles wide. Some dry holes may be drilled within the area, at spots where the reef buildup is insufficient or the pay too tight, but at this time it appears that around 45,000 acres could be classed as proven or semiproven. Because the gas produced by Sharon Ridge reef wells contains appreciable amounts of hydrogen sulfide, and the other reef wells yield sweet gas, many geologists expect this reservoir will prove to be separate from the other three fields.

There also appears to be little question that the reef discoveries represent the greatest addition to our domestic crude reserves since East Texas came into being 19 years ago. Even using conservative recovery figures and assuming that oil will be produced solely by a solution-gas expansion drive, it is not difficult to arrive at an oil reserve of almost a billion barrels. Should a partially effective water drive materialize, and some reservoir engineers anticipate such will be the case, the new reserve should exceed this figure.

Evaluation streamlined. — In connection with reserves, the recent introduction of "Micro-logging" has greatly expedited the estimation of the amount of permeable pay cut in Scurry reef wells. In so doing, financing of operations of some of the field's many independent operators likewise has been streamlined, for some banks in Dallas and Fort Worth are making loans on the basis of net pay shown by the log. The banks' petroleum experts merely add up the total footage of reef pay classed on the log as "good" and then multiply this total by whatever acre-foot recovery figure their evaluation engineers have set as a safe basis for loans. Other factors, of course, are taken into consideration but considerable weight is given the log.

The Micro-log, recorded on a separate run after conventional electric logging, shows the comparative permeability of each foot of the entire pay section drilled. Experienced interpreters with the service company (Schlumberger) then class each section of hole drilled as "good," "fair," "poor," etc. Its value lies chiefly in the rapidity with which the pay's permeability can be evaluated.

Currently, the biggest question mark in reef play is whether or not Amerada Petroleum Corp.'s discovery in adjacent Borden County will prove to be an extension to the Scurry reef fields. While the company has yet to complete the wildcat as a commercial well, a Canyon reef pay was topped at a subsea depth of minus 4,467 ft. and on drill-stem tests showed for a likely producer. *(See The Oil and Gas Journal, December 8, page 113).* The test, the company's 1 Von Roeder, is 4 miles west of nearest Canyon production in Sharon Ridge.

Life in Snyder.—Hub of all this activity is Snyder, which today has a population of about 12,000 whereas a year ago it was less than 5,000 when it was just beginning to be an oil boom town. As might be expected, the city's sidewalks swarm with people and traffic during daytime is bumper to bumper. To care for the problem of providing parking space for automobiles the city has converted the courthouse lawn into a parking lot, completely hard surfaced.

Despite the construction of a dozen new modern tourist courts and the erection of many new homes, housing facilities have been unable to keep pace with the rapid influx. It is estimated that about one-fifth of the city's population is living in trailers, spotted in camps throughout and around the city. It is next to impossible to find a room for overnight, even when seeking one early in the day. Most hotels and courts will not ac-

While other cities talk and talk about their parking problems, overcrowded Snyder found it had to do something. It hard-surfaced its courthouse lawn to provide space for the growing number of automobiles needing a place to stop

cept reservations. While the city's cafes and drive-ins are crowded, the food is exceptionally good for the boom-town conditions—and from the price standpoint not out of line.

In the Manhattan Hotel lobby and on the streets of Snyder, trading in leases and minerals continues at a rapid pace. Needless to say, the asking prices at this time are high. Royalty under acreage several miles from production, and well down on the flanks of the reef, costs from $300 up per acre. Producing royalties on tracts well up on the reef sell for $2,000 or more. One landowner, with acreage well situated on the reef, offered some royalty at $5,000 per acre but later withdrew the offer to sell for reasons of income taxes. Had it not been so quickly withdrawn one dealer in royalty said he would have closed the deal even at that high figure.

Speakers at the College Station A.I.M.E. meeting included the group shown here. Seated are George C. Howard, Stanolind Oil & Gas Co., Tulsa; George H. Fancher, University of Texas, Austin; and Edward F. Kelly, Dowell Incorporated, Houston. Standing, left to right, are A. G. Guermard, City National Bank, Houston; B. R. Weaver, Tide Water Associated Oil Co., Midland; R. E. Bush, Lane-Wells Co., Odessa; Bruce Barkis, B. & W., Inc., Houston; A. B. Stevens, Texas A. & M. College, College Station; Robert Todd, Core Laboratories, Inc., Dallas; and R. L. Whiting, Texas A. & M., College Station

Field Processing

Latest applications outlined at regional N.G.A.A. meet

R. B. Tuttle

AMARILLO. — Field processing of natural gas from a practical standpoint was the theme of the Natural Gasoline Association of America regional meeting held here last week.

The 1-day technical program included subjects ranging from maintenance of cooling equipment to instrument application. The discussions were designed specifically for the station, plant, and process operator, a relatively new policy of N.G.A.A.

Transportation. — Operations in natural-gas transportation systems, a branch of the industry not heretofore occupying a prominent position in the N.G.A.A. technical programs, came in for discussion at the meeting.

Methods for automatic operation of compressor stations and automatic package units for gas dehydration were shown to have advantages other than in payroll savings. With a minimum number of controls a new 3,000-hp. compressor installation located in the Shamrock, Tex., field has been operating unattended for 10 months.

Another station operated at Cayuga, Tex., has been operating automatically 4 years with an average on-time efficiency of 96.3 per cent. Like the automatic compressor stations, automatic dehydration was shown to be highly successful.

Another technical discussion on natural-gas transmission covered the application of heat exchangers in cross-country pipe-line systems. In this discussion the application of exchanger equipment included operations in connection with dehydration as well as oil and gas cooling.

Instrumentation.—On the subject of instrumentation of natural-gas processing plants, the entire control system in a light-ends fractionation operation was discussed relative to application. The particular plant involved was equipped with a full array of controllers. Of the 28 board-mounted instruments installed in this plant only 4 were indicators, the others being recorders.

Treating.—A discussion on the operating problems related to gas treating covered both batch and regenerative systems. This discussion was confined to removal of H_2S. Details were given on the operation of a plant processing approximately 1,750,000 cu. ft. daily of gas having an H_2S content of 6 grains per 100 cu. ft.

Hydrafrac Record: 65%

Of first 105 reports on wells treated by new production method, 69 were of increased output, A.I.M.E. is told

Leigh S. McCaslin, Jr.

COLLEGE STATION, Tex.— Production has been increased in 65 per cent of the 131 wells treated by the unique "Hydrafrac" process since it was placed in commercial use 9 months ago.

Hydrafrac is a development of Stanolind Oil & Gas Co. and is being performed as an oil-field service by Halliburton Oil Well Cementing Co. In brief the process involves adding uniformly-grained sand and a jelling ingredient to kerosine and pumping this mixture into a well under high pressure. The pressure breaks down the formation, causing a crack extending away from the well bore. The jellied mixture loses its high viscosity and flows away, leaving the sand to keep the crack propped open. This crack increases the effective permeability of the well and, presumably, the production also.

A report on all wells treated up to December 1 was presented by Tom E. Morton, a Halliburton division engineer, to the annual joint meeting of the Texas sections of the American Institute of Mining and Metallurgical Engineers, held at Texas A. & M. College. Morton's report covered 157 treatments in 131 wells in various

SUMMARY OF HYDRAFRAC JOBS TO DECEMBER 1, 1949

Division	Wells treated	Number fractures	Wells reported	Fractures reported	*Wells increased	*Per cent increased
Oklahoma	50	54	42	45	35	83.3
Central Texas	27	28	22	23	14	63.6
Rocky Mountain	16	33	13	26	10	76.9
East Texas	5	5	5	5	0	0
North Louisiana	5	5	4	4	2	50
South Texas	3	4	3	4	0	0
Eastern	7	7	5	5	3	60
SW Texas	3	3	3	3	0	0
West Texas	4	5	3	4	2	66.7
Kansas	8	8	3	3	2	66.7
California	3	5	2	4	1	50
Totals	131	157	105	126	69	65.7

*Based on wells reported

regions of the country representing many different types of producing formations. (See accompanying table.)

Rate of success.—The Halliburton engineer pointed out that the present percentage of wells helped by the process is 65.7 as compared with 56 per cent 4 months ago. He attributes this to increased knowledge of the process fundamentals, more complete understanding of its range of application, and improved well-condition analysis before application.

Particularly encouraging, Morton said, is the large number of wells showing a sustained production increase. Many of them have been producing for several months at the improved rate. Some have declined to their original production, but a few have shown a gradual increase with time.

Morton answered the question of whether increases are merely new rates of production or whether they result in greater ultimate recovery. He said that it has been proved definitely that a successful treatment results in increased effective permeability. This, plus a careful examination of results to date, indicates that ultimate recovery will be increased.

Gravel packing.—Great interest was shown in a gravel-pack completion method described by Thomas S. West who is associated with Al Buchanan and Blanco Oil Co. in San Antonio. Gravel packing is being used in South Texas as a selective completion method to exclude gas and water rather than for the more conventional use of excluding sand. To date, the procedure has been followed in five shallow, low-pressure wells with a high gas-oil ratio.

As described by West, the method is as follows: Alternate layers of gravel and a gravel-sand mixture are placed in the well (after the sand face has been cleaned). Oil is continuously injected into the annulus between the tubing and casing. The purpose of this oil is to keep saturated that portion of the gas sand adjacent to the well bore, thus preventing the gas from being produced with the oil. Next, the tubing is raised and lowered (thus changing the position of the downhole packer) until the optimum producing level is found.

GULF COAST

Gas-Line Progress

Transcontinental lets contracts for 734.5 miles of huge gas line, asks FPC for authority to increase capacity

Leigh S. McCaslin, Jr.

HOUSTON.—The superlatives of Transcontinental Gas Pipe Line Corp.'s 1,840-mile line moved closer to reality last week.

Contracts were awarded for three river crossings and nine sections of line totaling 734.5 miles, or 40 per cent of the total line. Company officials announced that the 1949 phase of construction is on schedule despite the coal and steel strikes. And in Washington hearings began on the company's application to increase the delivered capacity of the line from 340,000,000 cu. ft. daily to approximately 505,000,000 cu. ft. daily.

Many superlatives have been applied to Transcontinental, including: "longest pipe line ever built as a single project;" "first line built for the primary purpose of supplying gas to the Philadelphia - New Jersey - New York area;" "biggest large-diameter pipe line ever laid;" "largest investment of any pipe line built as a single project;" "largest pipe line construction program for 1950—a tremendous year in pipe-line construction."

Contracts let.—The line-laying contracts announced in Houston cover sections from Danielsville, Ga., right on in to New York City. Successful bidders on the nine jobs included: Williams Brothers Co., R. H. Fulton & Co., O. R. Smith Contracting Corp., Associated Engineers & Contractors, Inc., Wunderlich & Griffis Construction Co., and Oklahoma Contracting Co. Contracts also were awarded to Omaha Dredge & Dock Co. for crossings on the Hudson, Hackensack, and Passaic rivers. Details on the new contracts may be found in a "progress-report" table on page 101.

Transcontinental split the construction of its system into two major parts: a 1949 and a 1950 program. The 1949 phase of the program consists of the laying of 608 miles of 30-in. line and the building of five compressor stations. This work is on schedule, indicating the target date of October 1, 1950, for the over-all completion will be met. The 1950 program is roughly twice as large as the 1949 phase.

Expansion planned.—In Washington, Transcontinental is presenting testimony at FPC hearings in support of its application to increase the line's capacity to 505 million cubic feet daily. If authorized by the commission, the increase will be accomplished by the addition of 10 compressor stations, an increase in compressor horsepower capacity from 72,000 to 209,120, and the substitution of approximately 360 miles of 30-in. pipe for the 26-in. pipe presently authorized for sections at both ends of the main line.

The cost of constructing the additional facilities is estimated at approximately $50,500,000. This would bring the total estimated cost of the line to $242,000,000.

Five of the contemplated 20 compressor stations on the line are now being constructed by Fish Engineering Corp. of Houston. These stations will have 58,400 installed horsepower of the contemplated total of 209,120. The total horsepower is divided approximately equally among the 20 stations planned. Average station spacing is about 80 miles.

Routine operations in Mississippi on the huge Transcontinental line. A cleaning and priming machine does its job on the 30-in. pipe where it crosses a small stream

Maximum efforts are being concentrated on constructing the system from near Eunice, La., to the various delivery points in the East. This is because Eunice is the tie-in point of the easternmost gas-supply lateral to the line. Thus, some gas can be supplied to the East while the remainder of the line is being built. *(See The Oil and Gas Journal, October 6, page 182).*

Initial market use of the gas in the East will be to enrich manufactured gas. Major customers of Transcontinental at the delivery end of the line will be Brooklyn Borough Gas Co.; Brooklyn Union Gas Co., Consolidated Edison Co. of New York, Public Service Electric & Gas Co., Long Island Lighting System, Kings City Lighting Co., and Philadelphia Electric Co.

Lube-Output Shift

With Cit-Con refinery operating, Cities Service plans to close lube-oil facilities at Ponca City, Titusville

LAKE CHARLES, La.—The completion of the Cit-Con Oil Corp.'s $42,000,000 lubricating-oil refinery here, now operating near its capacity of 2,000,000 bbl. of finished lubricants and 70,000,000 lb. of wax annually, will result in some curtailment of lubricating-oil production at other refineries of Cities Service Co. which owns 65 per cent of the Cit-Con company.

It was learned here that Cities Service expects to shut down lubricating-oil facilities of its refineries at Ponca City, Okla., and Titusville, Pa. These refineries are operated by wholly owned subdisiaries.

Marketing plans.—The Cities Service company's share of Cit-Con production, about 4,000 bbl. daily, will be largely absorbed within the company's own marketing facilities, which are being expanded.

To blend and compound the lubricating stocks from Cit-Con, Cities Service is building a $4,000,000 plant near Chicago. During the navigable season the lubricants will be transported by water from here to the blending and compounding plant. Similar facilities along the Atlantic Coast will also be improved and enlarged.

It is understood that Richfield Oil Co., a large refiner on the West Coast of which Cities Service is a joint principal owner with Sinclair Oil Corp., also will be a large buyer of Cit-Con lubricants. Pemex, the government-owned company in Mexico, is a lubricating-oil customer of Cities Service.

Continental Oil Co., 35 per cent owner of Cit-Con, will market its share of the output amounting to about 2,000 bbl. daily largely to new customers. It is understood that the company has a contract with a large exporting company and will also increase its sales in Canada. It was indicated here that the company has plans to build a blending and packaging plant for lubricants at its Lake Charles crude-distillation and cracking refinery. This plant, when built, will serve its trade in this territory and along the East Coast. Each company will market its share of Cit-Con production separately.

Dedication. — Officials of the Cities Service and Continental companies were hosts here December 8 to more than 4,000 guests at their formal dedication of their joint Cit-Con enterprise. The guest list included representatives of other oil companies from all parts of the country, the trade and general press, and a number of federal and state officials from Louisiana. It was said to be the largest industrial celebration ever held in the state.

W. Alton Jones, president of Cities Service, L. F. McCollum, president of Continental, Sen. Russell B. Long, Congressman Henry D. Larcade of Louisiana, and Lt. Gov. William J. Dodd of Louisiana were speakers at the dedication ceremonies held in a tent at the plant with more than 2,000 in attendance. F. M. Simpson, vice president and general manager of Cit-Con presided. Previously more than 4,000 guests had been fed at lunch following bus trips through the plant.

Location.—The Cit-Con plant is located 13 miles from this city. Cities Service Co.'s 120,000-bbl. refinery which supplies the topped crudes for Cit-Con operations, a government-owned butadiene plant and the synthetic rubber plant of Firestone Tire & Rubber Co. (under lease from the Government) and the Cit-Con plant all adjoin each other, and the 11,000-bbl. Continental refinery is a short distance away.

A descriptive article on the Cit-Con plant appears in this issue, beginning on page 86.

Beaumont Fights Smog

BEAUMONT.—Los Angeles isn't the only city fighting a smog problem and threatening action against oil refineries. (See WEST COAST.)

At the request of Beaumont's mayor, a research engineer from the Bureau of Mines in Washington is here this week to try to find the source of destructive acid fumes which have caused property damage and discomfort to residents of South Beaumont. Suspicion points to oil refineries and chemical plants in the vicinity, and city officials propose to take legal action against any persons or industries proven responsible.

On some days recently the smog has been so acute as to destroy paint on houses, kill plants, and drive residents out of their homes.

Political Report

Legislators give preview of things to come in Louisiana

BATON ROUGE.—The Louisiana legislative committee on conservation thinks Commissioner S. L. Digby is doing a "superior" job and that the state has no need for a three-man conservation commission.

These views are contained in a report the committee will make to the state legislature next May. In announcing the highlights of its report, the committee said it will:

Recommend legislation for uniform gas measurement on a 14.65-psi. basis.

Recommend a "very substantial" increase in appropriations for the Louisiana Conservation Department.

Recommend that operators establish a better public-relations program.

Oppose any arbitrary limit on the size of unitized lease programs under the "forced" unitization law.

Recommend that the principle of trial de novo (retrial on the merits) be adopted in appealing commission decisions to courts "when a substantial fraction of interested parties desire appeal." There was a close vote on this subject, and a minority report is expected. "Substantial fraction" was not defined.

Favor, in principle, forced unitization of pools or reservoirs for repressuring, recycling, secondary recovery, etc.

Recommend that royalty payments be accompanied by detailed reports on derivation and prices.

Rainy Buys Gas Company

HOUSTON.—Controlling interest in Louisiana Natural Gas Corp. has been purchased by W. J. Rainy, Inc., and affiliates, of Pittsburgh.

Louisiana Natural operates a 100-mile gas line from near Lake Charles, La., to serve Woodlawn, Tepetate, and Chalkley communities.

Frank S. Kelly, executive vice president of Louisiana Natural, said the company will continue to operate under the same name and management. Rainy bought the stock from W. A. Delaney, Jr., chairman; A. B. Harper, president; and B. A. Hardy, secretary-treasurer.

Compact Sets Policy

Commission defends consideration of market demand in fixing allowables, worries officially about imports

C. O. Willson

NEW ORLEANS. — As the 3-day meeting of the Interstate Oil Compact Commission was brought to a close December 7, two conclusions of primary importance to the entire oil industry involving future policy stood out, among the several matters under consideration.

1. A majority of the commission feels that market-demand provisions are an essential part of state conservation programs and that the enforcement of these laws in the states where they are effective has been legal and has served the primary objective of preventing waste.

GOV. TURNER

2. Imports of crude oil and products into this country now greatly exceed the "supplementary" requirements. If the further indicated expansion in imports for 1950 materializes, domestic producers will have only a small increase in their demands following a year in which they have been compelled to reduce their output materially in several states due in part to increased competition from foreign fields and refineries.

Market demand.—A panel discussion of the market-demand statutes was in recognition of criticism both within and outside the oil industry, including official Washington. It has been contended that as enforced by several states limitation of output to market demands is in effect a price-fixing device which in many instances has worked a hardship on both producers and refiners as well as being contrary to sound public policy.

The market-demand provisions are part of the state conservation laws of Alabama, Kansas, Louisiana, New Mexico, Oklahoma, and Texas, and in all cases have been used over the past year when it has been necessary to reduce output to keep supply in line with demands.

The panel discussion reviewed all the arguments that have been presented in favor of the market-demand provisions and the consistent line of court decisions which in recent years have maintained their legality as then applied. In summary, those who participated in the panel contended that production in excess of reasonable market demand resulted in physical waste and that insofar as the enforcement of conservation measures were concerned there was no difference between economic and physical waste and as a practical measure it was impossible to separate the two.

It was pointed out that its enforcement has increased the ultimate recovery of both oil and gas from many fields, a primary objective of all conservation efforts. It was stressed that the use of equitable allocations under the market-demand provisions had protected the correlative rights of operators. Any effect on price as a result of the variations in allowable production under the market-demand regulations. it was agreed, is "incidental."

"Without the benefit of the market-demand statute, the Texas oil industry would have been retarded greatly," Gen. E. O. Thompson, member of the Texas Railroad Commission, said. Thompson was unable to attend the meeting but his prepared discussion of the market-demand oil law in Texas was read. He explained in some detail the workings of the law in connection with monthly changes in allowables. He emphasized that its enforcement did not create shortages but that all demands for oil were supplied in full, taking into consideration the seasonal changes in consumption and the necessary variations in stocks.

W. P. Z. German, Midland, Tex., attorney, in the open-forum discussion advocated that the compact commission widen the scope of its activities so that it could give consideration to production operations outside the United States. He pointed to increased imports in this country and other developments as having brought about a situation in which the commission would of necessity have to consider outside developments in order to protect domestic operations.

As an aid to the discussion of the market-demand laws and those applying to pressure maintenance and cycling, Blakely Murphy of Tennessee, secretary of the legal committee, provided summaries of laws and bibliographies. Copies of these reports are available from the commission headquarters in Oklahoma City.

Significance of imports.—The report of the supply and demand committee of the Independent Petroleum Association of America blamed increased imports in part for the failure of industry to arrive at the desired balance in operations the last quarter of this year and said further gains in imports would jeopardize the effectiveness of corrective measures through the first quarter and later in 1950.

The committee blamed higher-than-average temperatures for the fact that the last-quarter demand for petroleum will be about 200,000 bbl daily less than was predicted before the quarter started. It pointed out that the estimated average imports of 780,000 bbl. daily for the last quarter meant that the demand for domestic production had been less than expected.

In its projection for the first quarter of next year the committee estimated the new supply required at 6,520,000 bbl. daily. This is 200,000 bbl. daily greater than the revised estimates for the last quarter of this year. Based on the 1948 A.P.I. committee report on long-term availability, the committee estimated that 6,330,000 bbl. daily of domestic supply

Four oil-state governors at the New Orleans meeting of the Interstate Oil Compact Commission: Gov. Frank Carlson of Kansas, outgoing chairman of the commission; Gov. Earl Long of Louisiana; Gov. John M. Bonner of Montana; and Gov. Allan Shivers of Texas

would be available, including 460,000 bbl. daily of natural-gas liquids.

"Summarizing the outlook for supply and demand during the first quarter of 1950," the report concluded, "with imports of 190,000 bbl. daily and with stock changes as estimated in this report, domestic crude-oil production would be increased by about 770,000 bbl. daily over current levels. With imports at 850,000 bbl. daily, additional domestic production required during the first 3 months of 1950 over and above the actual production for the fourth quarter of this year would be 130,000 bbl. daily. This level would be about 430,000 bbl. daily below the level of the fourth quarter of 1948."

The report was signed by 16 I.P.A.A. members from all parts of the oil country and was presented by H. B. Fell, executive vice president of the association and chairman of the committee.

Resolutions. — The commission asked the House judiciary committee to make a report without delay recommending legislation to return the tidelands to the states. The Senate was urged to proceed with hearings as soon as Congress meets. It is understood that proponents of the states' position are hopeful that quick action by Congress can be obtained after the first of the year in advance of a Supreme Court decision in the Texas and Louisiana cases now pending.

Another resolution urged Secretary of Interior Chapman "to abandon any thought of issuing wildcat leases on public lands only upon competitive bidding." The resolution urges that regulations be liberalized to aid independent oil men so that they "no longer follow tactless technical lines but be upon a fair, general interpretation so that the operator will feel that he has had a square deal from his Government.

Committee reports. — The regulatory practices committee prepared a report on salt-water disposal and plugging of either exhausted producers or dry holes.

The committee on secondary recovery, which recently completed a report on projects in Kansas, now has under consideration similar reports for other areas.

New officers. — Gov. Roy J. Turner of Oklahoma, who has taken an active part in the work of the compact for the past 3 years, was elected chairman for the coming year, succeeding Gov. Frank Carlson of Kansas. Other officers are James McClure, Jr., Sardis, Miss., first vice chairman; H. J. Wagner, Charleston, W. Va., second vice chairman; and Earl Foster, Oklahoma City, executive secretary. Lawrence Alley of Oklahoma City is assistant secretary.

The spring meeting of the compact will be held at Biloxi, Miss., May 4 5, and 6, and the summer meeting will be held at French Lick, Ind., August 3, 4, and 5.

Keeps It Clean

The canvas chute shown here is an important factor in maintaining first-order housekeeping at the 200,000,000-cu. ft. daily natural-gasoline plant of United Gas Pipe Line Co. in the Carthage, Tex., area.

Connected to one of three dehydration vessels, it is used in removing spent desiccant to prevent the spreading of dust on plant equipment. It also eliminates the necessity for frequent rigging up of bucket and hoisting equipment for unloading.

To reduce spill-over at its inlet end the chute is provided with a large rectangular opening. Discharge end of the chute is circular. A hopper-bed truck or other mobile type hopper receives the spent desiccant discharged from the chute. A light-duty hoist is used to place the chute in position.

Record Imports

October figure of 778,710 bbl. daily is new 1949 high

IMPORTS of crude oil and petroleum products into continental United States during October amounted to 778,710 bbl. daily, according to figures of the U. S. Department of Commerce. This establishes another record for the year and exceeds the previous high set in September by 118,410 bbl. daily.

Crude imports were 74,239 bbl. daily greater than in September with about 80 per cent of the increase accounted for by gains in imports from Venezuela. Middle East imports were up about 20,000 bbl. daily but volumes from Mexico and Colombia dropped slightly.

About 90 per cent of total crude came into East Coast ports with the other 10 per cent going to the Gulf Coast.

Residual fuel imports averaged 281,000 bbl. daily in October, a gain of 45,000 bbl. daily or 19 per cent over September.

Exports from continental United States, excluding shipments to noncontiguous territories, averaged 275,935 bbl. daily compared with 250,267

IMPORTS INTO CONTINENTAL UNITED STATES

(Thousands of barrels)

	Oct. 1949	Sept. 1949
Crude:		
Mexico	544	633
Colombia	920	994
Venezuela	10,910	8,719
Kuwait	2,062	1,782
Saudi Arabia	625	220
Total crude	15,061	12,348
Barrels daily	485,839	411,600
Products:		
Residual fuel	8,711	7,081
Other oils	368	380
Total products	9,079	7,461
Barrels daily	292,871	248,700
Total all oils	24,140	19,809
Barrels daily	778,710	660,300

EXPORTS*

	Oct. 1949	Sept. 1949
Crude	2,919	2,619
Gasoline	2,458	2,248
Other oils	3,180	2,641
Total all oils	8,557	7,508
Barrels daily	275,935	250,267

*Does not include shipments to noncontiguous territories which for past months have averaged about 10,000 bbl. daily.

bbl. daily in September and 317,387 bbl. daily in August.

If an estimated 40,000 bbl. daily for shipments to noncontiguous territories is added to exports to bring the average up to a Bureau of Mines basis, total exports would be about 316,000 bbl. daily. If bunkers and military liftings are not considered as exports, this country was a net importer in October of about 460,000 bbl. daily.

Crude-Oil Stocks

Study suggests increase not as big as announced

John C. Casper

THE week ended December 3 was another of those first-of-the-month periods when crude-oil stock changes reported to the Bureau of Mines did not reflect the true picture.

The bureau reported an increase in stocks of domestic crude amounting to 3,040,000 bbl. or 434,000 bbl. daily.

Crude production for the week, computed on the same basis as the bureau's stocks, averaged 5,118,000 bbl. daily. Refinery runs of domestic crude were reported by the American Petroleum Institute at 4,836,000 bbl. daily. The total for crude exports, transfers, and field use is estimated at 134,000 bbl. daily. On this basis, total crude accounted for amounted to 4,970,000 bbl. daily, leaving 148,000 bbl. daily for increases in inventories. This is 286,000 bbl. daily less than the gain reported by the bureau.

Weekly production and refinery data may vary somewhat from final figures but it is hardly possible that the differences amounted to as much as 286,000 bbl. daily. A calculated crude balance for the previous week seems to indicate that part of the bureau's increase should have been credited to the week of November 26.

Runs of domestic crude for the week of November 26 averaged 4,860,000 bbl. daily. If 134,000 bbl. daily is again used for exports, transfers, and field use, total accounted for amounts to 4,994,000 bbl. daily. Production for the week was about 5,220,000 bbl. daily, leaving 226,000 bbl. daily for additions to storage. The bureau reported a domestic crude-stock decrease of 7,000 bbl. daily. *(For discussion of this lag in reporting crude stocks, see The Oil and Gas Journal, November 3, 1949, page 37.)*

Crude production for the week ended December 10, the first full week under the reduced December allowables, decreasd almost 240,000 bbl. daily from the week ended November 26, the last full week under November allowables. Even if runs of domestic crude in December do not rise above the November 26 level, crude stocks will decline.

MIDWEST

"Largest" Gas Line

Peoples Gas Light & Coke Co. plans 1,400-mile, 30-in. line to Chicago with capacity of 585,550,000 cu. ft.

CHICAGO. — Plans for the largest gas pipe line, from the standpoint of initial capacity, ever constructed in the United States have been perfected by Peoples Gas Light & Coke Co., Chicago.

It will run from the lower Texas Gulf Coast to the Chicago area, approximately 1,400 miles in length and mostly 30 in. in diameter, will cost between $140,000,000 and $150,000,000, and will have initial delivery capacity of 585,500,000 cu. ft. of gas daily at 14.65 psi. Application for a construction certificate has been filed with the Federal Power Commission, and completion is scheduled for the fall of 1951.

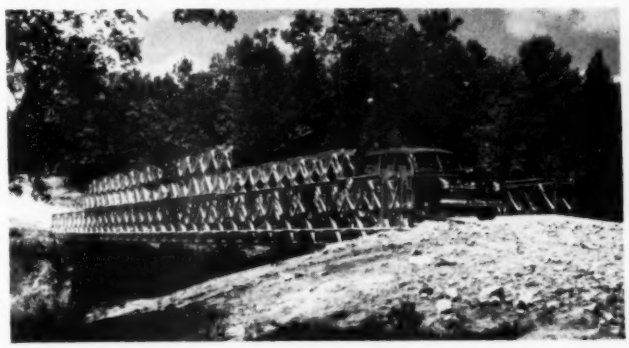
The project incorporates plans of Gulf Coast Northern Gas Co., Tulsa, which more than a year ago proposed to build a similar line. The new line will be built and operated by Texas Illinois Natural Gas Pipeline Co., a newly formed subsidiary of Peoples Gas Light & Coke Co., with Peoples Gas and Northern Natural each taking 50 per cent of the stock. Northern Natural has turned over to the new company the gas reserves it has accumulated along the Gulf Coast and will drop plans for its own line.

Reserves.—Gas reserves already committed to the project are claimed to be sufficient to permit delivery of 538,325,000 cu. ft. daily at 14.65 psi. for a period of 20 years, and negotiations are in progress for additional reserves. The bulk of these reserves are in La Gloria and Old Ocean fields, Texas, and others are along the general route of the line.

Construction plans. — The line will originate near La Gloria field in Jim Wells and Brooks counties, Texas, and will be 26 in. in diameter to a point 50 miles southwest of Houston. The rest of the line will be 30 in. and will run to a point 60 miles northeast of Houston, thence to the Arkansas border 12 miles south of Texarkana. It will hit the Missouri line near Corning, Ark., cross the Mississippi River 17 miles north of Cape Girardeau, and terminate at Joliet, Ill., where it will connect with the system of Natural Gas Pipe Line Co. of America for distribution in the Chicago area.

Compressor stations are planned near Clark and Gilmer, Tex., and Poplar Bluff, Mo.

A 26-in. lateral is planned from near Little Rock, Ark., to near Greenville, Miss., designed to deliver up to 285,000,000 cu. ft. of gas daily to Piedmont Natural Gas Corp. This company now has an application



***TEMPORARY CROSSING.**—The bridge shown above is part of an access road to a wildcat location in the Gulf Coast area. The structure shows a civilian application of the World War II Bailey bridge, developed for emergency crossing of ravines or rivers. It has been adapted to peacetime use by a new Houston service company. Portable bridges, steel roadway material, and assorted portable pontoon barges have been tested with many kinds of oil-field equipment and are designed for use under maximum load conditions found in usual oil-field service. The equipment is being made available on a rental basis. A detailed story on this development will appear in an early issue of The Oil and Gas Journal*

pending before the FPC to construct a 965-mile, 26-in. line from Greenville to several communities in Virginia and the Carolinas. Piedmont has no gas reserves of its own but previously had arranged with Gulf Coast Northern to supply gas to it at Greenville if its application is approved. Gas from the new line not taken by Piedmont will be transmitted to Chicago.

Significance.—This will be the first entry of Gulf Coast gas into the Chicago area, which now is served with gas principally from the Hugoton-Panhandle area. It will increase the supply of natural gas in Chicago by about 60 per cent.

History.—Completion of plans for the new line apparently ends something of a contest to furnish new midwestern outlets for uncommitted reserves of natural gas along the Gulf Coast. First entrant was Trunkline Gas Supply Co., Washington, D. C., which more than 2 years ago sought to build a line into Iowa to provide an additional supply of gas to several transmission lines serving the Midwest with Hugoton - Panhandle gas. Later Trunkline made an agreement to supply 250,000,000 cu. ft. daily to Northern Natural Gas Co., Omaha, by a 711-mile line from Edge, Tex., to Palmyra, Neb., and the FPC authorized construction of this project. Still later Northern Natural dropped the deal and applied for authorization to loop its present line from the Panhandle region. Last month Trunkline asked FPC to change its authorization to permit it to build a 740-mile, 26-in. line from Longville, La., to Tuscola, Ill., to deliver 250,000,000 cu. ft. daily of Gulf Coast gas to Panhandle Eastern Pipeline Co.

The second entrant was Gulf Coast Northern, formed in August 1948 to build an independent line into the Chicago area to market gas to established utilities there. One of the chief potential customers was Peoples Gas Light & Coke Co., which had a minority interest in Natural Gas Pipe Line Co. of America and was the chief purchaser of this company's West Texas and Kansas gas.

About a year ago, however, Peoples purchased full control of Natural and also of Texhoma Natural Gas Co., and proposed to develop its own additional sources of natural gas. Last July it formed Texas Illinois Natural Gas Pipeline Co., a Delaware corporation, and sought gas reserves along the Gulf Coast.

Merger of the projects of Peoples Gas Light and Gulf Coast Northern combines an adequate gas reserve and a waiting market, and insures adequate financial backing, so speedy approval by the Federal Power Commission is anticipated. The application provides for apportioning the new gas among several utilities in the Chicago region.

WATCHING WASHINGTON

Bertram F. Linz

More Cause to Worry

The National Security Resources Board is worried about the oil situation again.

Several factors are at the bottom of discussions which reportedly are going on in the board and which may result in recommendations to Congress next year for action to restore the lost balance between coal, oil, and gas.

Among those factors are the maneuvering of John L. Lewis and the great expansion of natural gas pipe lines, but by far the most important is Lewis and the switch from coal to other fuels by the railroads, industry, and consumers for which he has been in part responsible.

Some in the board appear to be fearful that by the time Lewis gets through there won't be any market for coal. Even as it is, if recent trends continue the economy may become so dependent upon oil as to court disaster in the event of war. Once definitely tied to oil, it would be impossible to expand coal production and convert railroads, industry, and consumers so as to free oil in sufficient volume for war purposes.

A lot of suggestions have been advanced for meeting the situation, but in the final analysis they all boil down to one thing, the encouragement of continued heavy coal production.

To that end, it may be suggested to Congress that a formula be set up by law requiring industry to use coal for certain purposes, and a new effort may be directed toward quick establishment of the synthetic liquid fuels industry. Some would even like to see a prohibition on the use of oil by householders for space heating, but nobody would be willing to accept the responsibility of making such a recommendation officially.

What Will Wallgren Do?

The oil industry early next year may get an idea of where new Federal Power Commissioner Mon Wallgren stands with respect to federal control of independent producers and gatherers of natural gas.

Wallgren's views are expected to be made known when the commission again passes on the application of the Delhi Oil Corp. of Dallas for a determination whether the proposed sale of gas from its holdings in the Barker Dome field, New Mexico, to the El Paso Natural Gas Co. would bring it under FPC jurisdiction—a case in which the commission already has said "yes," "no," and "maybe."

Delhi made its contract with El Paso last February—providing for its cancellation in the event the commission held adversely on an application it immediately filed for a status determination. In March, the commission held the sale would be at arm's length and Delhi would not be subject to its jurisdiction.

In August the FPC wrote to Sen. Carl Hayden of Arizona, who was interested in the El Paso application for a pipe line from the San Juan basin to the Arizona-California border which would serve a number of Arizona cities, saying the sale of gas by Delhi would bring it under the act. Upon learning of that letter, Delhi asked for clarification and, after some delay, was informed the commission was unable to express a conclusive opinion as to its standing.

By this time Delhi was probably a little dizzy; anyway, it asked the commission please to start over and hear argument again when it considers the El Paso application January 4, and that brings Wallgren into the picture, since it is the first time the question of the independent producer and gatherer has come before the commission since he took over the chair formerly held by Leland S. Olds.

Deficit? Where?

A new form of budget reportedly is being prepared by the Budget Bureau which will show that the federal Government actually is operating in the black, with money to spare for getting further segments of the Fair Deal social program under way.

Over the past 17 years there has been considerable tinkering with the budget to create a favorable atmosphere for administration programs, and charges that the Government was keeping a double set of books have been frequent.

Now it is proposed to set up the government bookkeeping on the same basis employed by corporations, differentiating between expenditures for running the federal establishments and those "invested" in roads, schools, public works, etc.

But smart as the budget boys may be they're not going to be able to camouflage the public debt, now standing around $257 billion.

Earth-Origin Theory

Urey suggests to A.C.S. that radioactivity gave earth its present form; role of chemists in industry is discussed

Kenneth B. Barnes

OKLAHOMA CITY.—The manifold contributions of the chemist and chemical engineer to the industrial expansion of the Southwest were spotlighted here December 8-10 during the American Chemical Society's fifth annual southwest regional meeting, with 650 chemists and engineers in attendance. Here are some of the new developments and studies reported.

Radioactive hypothesis. — Radioactivity, which man has now begun to harness for his own use, was largely responsible for the development of the earth as we know it, according to a new theory of the planet's origin described by Harold C. Urey, Nobel Prize-winning chemist of the University of Chicago Institute for Nuclear Studies. Dr. Urey suggested that heat generated by radioactive materials in the heart of an ocean-covered earth brought about vast structural changes which gave us the great land masses on which we live today.

The hypothesis outlined by Dr. Urey differs radically from the view, widely held in the past, that the earth was formed at a very high temperature and has been cooling off ever since. On the contrary, according to the new theory, the earth has grown warmer since it "accumulated" some 2 billion years ago from a huge dust cloud which the sun had acquired during its travels through space. At the start, the earth probably consisted of a low-density core, followed by a layer of a mixture of iron and stone, and on the surface a very thin layer of rock. Covering the whole was a layer of water.

During the first stage of the earth's history, Dr. Urey said, radioactive uranium, thorium, and potassium in the stony regions raised its temperature until the iron layer melted. Then the iron dropped to the center of the globe, forming a heavy, dense core, which displaced the lighter materials originally there and floated them up the surface. It was thus that the continental land masses and the deep Pacific basin were formed, he explained.

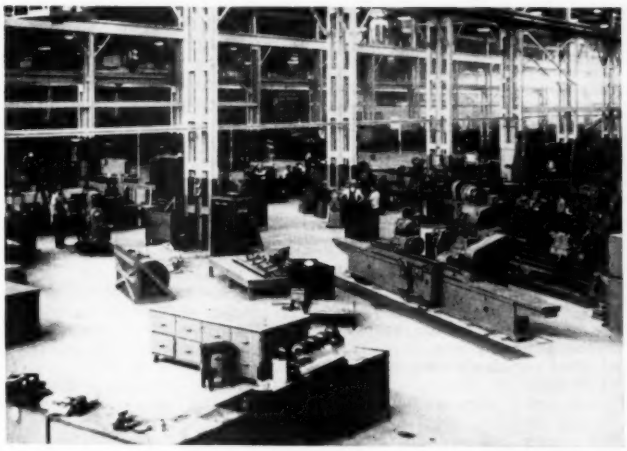
An indication that dry land first appeared about 500 million years ago was seen by Dr. Urey in the fact that no fossil specimens from an earlier time have been discovered. Such creatures as may have lived more than half a billion years ago presumably were sea animals, whose skeletons were too light to be preserved.

There probably was only a single continent for a time, according to the theory, but as material kept coming up from the earth's core and spreading out near the surface it broke this continent up and carried the sections apart. This idea ties in with the continental drift theory, advocates of which have noted that the eastern coast of the New World looks as if it has been split from the western coast of the Old World.

Contributions by chemistry.—Millions of dollars are being added to the wealth of the Southwest each year by conversion of natural resources into manufactured products, largely through the efforts of chemists and chemical engineers, Dr. James H. Boyd, director of the United States Bureau of Mines, told the gathering. In the four states of Arkansas, Louisiana, Oklahoma, and Texas alone, the value added to products by manufacturing soared from 815 million dollars in 1939 to slightly over 3 billion dollars in 1947, he said.

"One of the greatest contributions of the chemist to the industrial development of the Southwest is in the production and utilization of its wide variety of minerals," Boyd declared. "In 1940, about 35 million gallons of liquefied gas went into chemicals; while in 1948, 491 million gallons were used, of which about 60 per cent were used in the Southwest. In 1940, no synthetic rubber was manufactured. By 1948, 225 million gallons of liquefied petroleum gas were used for this purpose, of which 80 per cent was processed in the Southwest. It is estimated that 375 million dollars are invested by the petroleum and chemical industries in petrochemical plants in the Southwest, not including synthetic-rubber plants. Sixty different chemicals are manufactured by these plants and virtually all have resulted from the research and pilot-plant exploration of the chemist."

Shale oil, 300 billion barrels? — The feasibility of low-cost mining of oil shale by underground quarrying has been "essentially proved," reported five United States Bureau of Mines researchers. Declaring that oil shale offers "a major potential source of liquid fuels in the United States" to help offset the wartime depletion of the nation's petroleum reserves, the paper said current estimates place the oil content of shale in the vast Green



REFINERY REPAIR.—Pipe wrenches and hack saws still have their place in maintenance, but in the modern refinery they are supplemented by precision machinery of all kinds. Typical of such maintenance shops is that shown above, at Shell's Deer Park, Tex., refinery. Included in the equipment are lathes, drills, and other metal-working tools plus a large welding section in the background. A traveling bridge crane helps to move heavy equipment in the welding section; sand-blasting and parts-cleaning equipment is housed in a small building adjacent to the main shop. Nearly all of the refinery's equipment may be repaired in this shop

River formation of Colorado, Utah, and Wyoming at 300 billion barrels—about a 150-year supply at the present rate of consumption.

The Green River formation is the world's largest shale-oil reserve, spread over an area of about 16,500 sq. miles, the paper explained. Summing up approximately 8,000 assays which have been made in the Green River formation, the bureau men said: "It is estimated that a persistent oil-shale bed known as the Mahogany Ledge, approximately 80 ft. thick and assaying 30 gal. of oil per ton, contains 100 million barrels of oil per square mile, or approximately 100 billion barrels for the 1,000 sq. miles of this bed. Based upon present information, it is estimated that Green River oil shales in Colorado, Utah, and Wyoming, which assay 15 gal. or more of oil per ton of shale, contain 300 million barrels of oil, nine-tenths of which are in Colorado."

Symposiums. — Developments in petroleum chemistry were surveyed at five of the technical sessions. The first petroleum meeting considered the phase relationships of hydrocarbons. The determination of the critical properties of pure hydrocarbons and their mixtures also were discussed. Instrumental methods for analyzing petroleum products, and the application of Raman spectroscopy and polarography to the petroleum industry were reported at the second symposium.

The other meetings covered non-instrumental methods of analysis and separation of petroleum products, production of chemicals from petroleum, and chemistry of drilling fluids.

Kudos.—Dr. Frederick E. Frey, assistant director of research of Phillips Petroleum Co., who helped develop a new and cheaper process for making high-test aviation gasoline in World War II, was chosen to receive the 1949 Southwest Regional Award of the society. The award was given to Dr. Frey for major contributions in the field of petroleum chemistry during the past quarter century. Dr. Frey has received 90 patents in the United States and 55 patents in 13 foreign countries. He is coinventor of 53 other United States patents, and author of 22 published articles dealing mostly with hydrocarbon chemistry.

WEST COAST

Plain Talk on Smog

Taylor tells critics oil industry is tired of being the goat, suggests less talk, more action might help

Robert Harwick

LOS ANGELES.—It is said that a man who is right and admits he is wrong is married, but on this theory the local oil industry is determined to show that it is not married to Los Angeles smog.

Last week the industry let fly with a blast of righteous wrath in answer to an attempt by the Los Angeles County Board of Supervisors to close down all refineries in the area as a means of eliminating smog.

The answer, phrased by Reese H. Taylor, president of the Western Oil and Gas Association, said:

"The oil industry is fed up with being the whipping boy for every misinformed person claiming to be an expert on smog.

"For the last 2 years we have kept our mouths shut and spent more effort and money than any other group in the community trying to find out what causes smog and do something about it.

"We have spent 10 million dollars in the Los Angeles area trying to eliminate all possible sources of smoke and fumes from our refineries.

"In addition, in the last 2 years we have financed half a million dollars worth of independent scientific research through the Stanford Research Institute on the Los Angeles County smog problem.

"This information has been made available freely to everyone. In scientific circles it is considered the most authoritative fund of knowledge on smog in the world.

"Obviously the communities' self-appointed critics have not bothered to read the facts. We do not place ourselves above criticism, but we think such criticism should be based on the available facts.

"These are some of the facts:

"1. Sulfur dioxide is only one of more than 40 contaminants in the Los Angeles atmosphere that contributes to smog.

"2. There is twice as much sulfur dioxide in the Chicago atmosphere as in the Los Angeles atmosphere and yet they do not have eye-irritating smog.

"3. If all the sulfur dioxide in the Los Angeles area were removed, we still would have smog.

"4. In the past 10 years the population of Los Angeles County has increased from 2,738,390 to 4,006,000, or approximately 47 per cent; the number of automobiles has increased from 1,100,000 to 1,800,000, or approximately 64 per cent; the number of industrial plants has increased from 5,594 to 9,771, or approximately 75 per cent; while the daily refinery throughput of petroleum products has increased from 600,000 bbl. to 810,000 bbl., or 35 per cent.

"We are just as sick and tired of smog as anyone else. The big difference is we have been doing something about it while too many other people have just been talking about it.

"When the rest of the community has done as much as the oil industry, maybe we can begin to eliminate smog."

Taylor's reference to independent research was the elaborate program of Stanford Research Institute, described in last week's Journal.

In spite of this,, local politicians, fearful of the effect of smog on the tourist trade, real estate values, and public health, have continued to blame the oil industry.

In Pasadena one city official proposed that "an aroused populace" picket all oil refineries until smog is ended. A county commissioner offered a motion to require refineries to close down during periods of temperature inversion—which would be about 260 days out of the year.

These were the last straws in the oil industry's policy of passive resistance to the propaganda against it. Now it is fighting back.

Federal Intervention Asked

WASHINGTON.—The federal Government may be asked to take a hand in the smog problem in Los Angeles and elsewhere.

Last week the Pasadena City Council sent one of its members to Washington to ask federal assistance. The Federal Security Administration now has requests for surveys of the smog problem in 22 communities throughout the country. No funds are available for such surveys, which might cost $30,000 to $50,000 each, but requests for appropriations may be made by Congress next year.

While the federal Government last year assumed authority over the pollution of navigable streams, it has no such authority over air pollution at present. In general, however, federal officials think the states or localities have sufficient authority through their health departments to take such action as may be necessary to safeguard the life and health of the people from smoke hazards.

The "smoke nuisance" has been under attack in large cities for a number of years but it was not until tragedy struck the small town of Donora, Pa., in October 1948, causing a number of deaths, that attention was focused on the health threat created by factory chimneys in "bowls" where smoke and fog settle in "dead" air in a smothering blanket.

A thorough study of the Donora situation led to only most general

recommendations for dealing with smog, the most important being that plant activities be reduced or closed down when the Weather Bureau reports that conditions are ripe for the creation of smog.

Coalinga Field Unitized

LOS ANGELES.—Unitization in California at times has had bumpy going, but there still has been steady progress.

A notable achievement in this direction is the unitizing of the Coalinga Northeast field, a productive area of 2,000 acres with a November output of 5,124 bbl. daily.

Full unit operation is awaiting only installation of additional compressor facilities.

The unit is made up of Standard Oil Co. of California, Superior Oil Co., Amerada Petroleum Corp., Union Oil Co., The Texas Co., Bay Shore Oil Co., and a group of individuals working the Crandall lease. Three royalty interests, one direct and two override, are the only interests not included in the plan. They represent only three-eighths of 1 per cent of the total interest.

Standard Oil Co. is operating company for the group.

At Buena Vista, where one interest formerly was not included in the unit plan, the 27B zone now is 100 per cent unitized. Participants in the unit plan have acquired the interests in 27B of North American Oil Consolidated of San Francisco. In return certain oil production is being allocated to North American.

EASTERN

More Storage

Esso building in effort to solve winter-peak problem

THE problem of meeting peak demands for home-heating oil, which has been under considerable discussion in the entire oil industry recently, is being met by Esso Standard Oil Co. by increasing storage facilities.

"It is our belief," says Stanley C. Hope, Esso president, "that the economic approach to the problem is to plan more nearly even year-around refinery production of heating oil and to provide necessary storage facilities to absorb the seasonal fluctuations in demand."

The winter-peak problem, Hope wrote the company's independent distributors, could be met by building refinery capacity to care for top requirements; by adjusting refinery yields to meet current demands for seasonal products; or by building inventory in the off season and storing it against the time of demand.

While all these measures are being employed, Esso concluded that dependence on the first two alone would cause unnecessary fluctuation in crude production and seriously affect the continuity of employment in the refining industry.

As a result of this policy, Esso has just completed a program under which its facilities for storing heating oils has been increased by 52,000,000 gal. Of this, 50,400,000 gal., or 1,200,000 bbl., is in primary storage at refineries. The remainder includes conversion of facilities formerly used for other light products and increased storage capacity at a number of smaller bulk plants.

Esso is entering the current heating season with the largest heating-oil inventory in its history—about 2,500,000 bbl. more than the inventory thought adequate a year ago.

Penn Grade Price Up

BRADFORD, Pa. — The price of Pennsylvania Grade crude oil went up to $3.54 per barrel December 12.

This was the first price change since June 16, when an advance of 13 to 16 cents per barrel was made. That increase followed seven successive price cuts.

Joseph Seep Purchasing Agency of South Penn Oil Co. posted an increase of 14 cents per barrel for all areas where it purchases except in southwestern Pennsylvania where the increase was 15 cents due to a pipe-line rate adjustment in the delivered price.

The market price of Corning crude oil was not affected by the increase since it is not classified as Pennsylvania Grade and has remained at $2.70 per barrel since May 6. The agency made no announcement regarding Zanesville grade crude, which it does not purchase.

Asphalt Institute Elects

NEW YORK. — A new permanent post of full-time president was voted by the Asphalt Institute at its annual meeting last week.

In contrast with past presidents chosen from member companies, who assumed administrative head of the organization while still retaining their company affiliations, the newly elected president, Bernard E. Gray, will devote full time to the position. Gray was formerly manager and chief engineer with the institute, and his successor has not yet been named. He succeeds N. H. Angell, Stancal Asphalt & Bitumels Co., San Francisco.

Creation of the permanent presidency was dictated by the burden of administrative work brought on by the rapidly expanding institute. The organization announced two new member companies: American Bitumels Co., San Francisco, and Cosden Petroleum Corp., Big Spring, Tex.

Inghram Grayson of Lion Oil Co., El Dorado, Ark., was elected chairman of the executive committee.

Next Week

THE JOURNAL REPORTS ON

International Oil

Traditionally the last issue of the year, this year-end report on oil outside the United States has been advanced a week in its publication date this year. It will present 85 pages of engineering developments, statistics, and forecasts covering all phases of the industry. Journal editors were aided by outstanding authorities throughout the world in giving the petroleum industry its most complete annual report on international activities.

Among the engineering articles are discussions of wildcatting in Saudi Arabia, construction of Tapline, production methods in Kuwait, well repair in Tarakan, care and training of Indonesian employes, building of Europe's largest refinery, use of oil-emulsion mud and other drilling practices in Venezuela, Britain's new petrochemical plant, and new refinery construction in Bahrein, Venezuela, and other countries.

The report will give up-to-date information on reserves, production, demand, and drilling operations. The world's tank-ship fleet is the subject of discussion by one of the closest students of this phase of the picture. One of the exclusive features will be 30 pages of detailed data covering field, refining, and pipe-line activities. These surveys are compiled from reports sent to the Journal by operators everywhere, and in addition to their immediate value, will be valuable reference material throughout 1950. Another thoughtful discussion concerns dollar oil versus sterling oil, and the outlook for production, refining, and sales through 1950 and later. Finally, the Journal's Washington editor reports on how ECA charts Western Europe's oil operations through 1952.

MIDDLE EAST

Pipe-Line Developments

Politics delays one Mediterranean crude line; drop in expected demand cancels another; I.P.C. to finish in '52

Dahl M. Duff

CHANGED conditions in the Middle East over the last year have resulted in advancing the construction of the Iraq Petroleum Co., Ltd., 30-in. Mediterranean pipe line to a period ahead of the larger Middle East Pipelines, Ltd., project.

Under present plans, pipe deliveries for the I.P.C. project are expected to start late next year with completion some time in the second half of 1952. This line will extend from the Kirkuk producing area to the Mediterranean outlet in Northwest Syria near Banias.

The Middle East Pipelines plans have been set back by the failure thus far to obtain a right-of-way agreement from the Iraqi Government. Assuming favorable action on this next year, the line is not expected to get under way until probably late in 1951. It will originate at the Iranian border and end on the Mediterranean also in Northwest Syria.

One line canceled.—Plans for the fourth big-inch pipe line which had been projected in the Middle East are reported to have been dropped. This was to have been built to the Mediterranean from Kuwait by Gulf Oil Corp. and the Shell organization to whom Gulf sells most of its half share of the Kuwait production. It is understood pipe orders for this project were canceled several months ago.

The Gulf-Shell plans apparently were shelved because of the now more modest estimates of probably future demand for Middle East oil. These three projects, I.P.C., Middle East Pipelines, Gulf-Shell, together with existing I.P.C. capacity and the now-building Tapline, would have been able to lay down about 1,700,000 bbl. daily on the Mediterranean Coast. This is about 350,000 bbl. daily more than total production at present in the entire Persian Gulf-Iraq area. Gulf Oil in September was disclosed to have had preliminary discussions with Trans-Arabian Pipe Line Co. on the possibility of moving Kuwait production through Tapline.

Politics.—The failure of Middle East Pipelines to obtain a transit permit through Iraq appears to be tied into the over-all political situation in that country. It was reported some time ago that Iraqi officials felt their country's fields had been neglected in favor of development of areas around the Persian Gulf. Determined to force early construction of the big-inch outlet from Kirkuk, the government was said to have presented Middle East Pipelines with demands that were obviously and intentionally prohibitive.

With plans now well advanced for the Kirkuk line by I.P.C., there appears to be some hope that the Iraqi Government will grant right-of-way for the Middle East project before its Parliament adjourns next June. The three companies involved in the Middle East project—Anglo-Iranian Oil Co., Ltd., Standard Oil Co. (N. J.), and Socony-Vacuum Oil Co., Inc.—also hold nearly half interest in I.P.C.

Change in method.—In planning the construction of its 30-in. project, I.P.C. is considering a marked departure from its previous method of pipe-line construction. In the past, the company has constructed its own lines consisting of the 12 and 16-in. systems to Tripoli and Haifa.

The company has invited bids from two American pipe-line contractors for the laying of the 30-in. These are the Williams Brothers and the Bechtel organizations.

Pipe for the I.P.C. 30-in. will be American made, but it is not known if it will be manufactured at the Maywood, Calif., plant of Consolidated Steel Corp. Reports are that facilities at Orange, Tex., may be used. Middle East Pipelines' 34-36-in. diameter is to come from the Maywood plant. When finally completed this line will have capacity to deliver 535,000 bbl. daily on the Mediterranean probably at Tartus.

Iraq's own crude production has been stepped up in recent months to more than 100,000 bbl. daily as a result of the completion of the new 16-in. line to Tripoli. I.P.C. also has recently completed the construction of additional distillation facilities at its refinery at Tripoli.

This enlarged refinery was officially opened December 8. It now has a topping capacity of 512,000 tons a year or about 10,000 bbl. daily. The Lebanese minister of public works, Admed es-Assad, said the refinery, built at Lebanon's request, will meet all Lebanon and Syria's requirements.

Newcomer Scare

Operations no longer a bed of roses, Levy cautions

WASHINGTON. — Companies now just starting in on Middle East oil development are going to be up against a serious problem in marketing their output, Walter J. Levy, former chief of the Economic Cooperation Administration petroleum branch, predicted last week in an address at the School for Advanced International Studies.

Few of the limited number of independent refiners in the Eastern Hemisphere will be willing to spend dollars for crude under present conditions, Levy said; they will find it impossible to secure any sizable markets in Europe, and their efforts to secure outlets in the United States will run up against many difficulties, political and economic.

Big handicaps under which the late comers in Middle East operations must work include higher royalty and other costs as well as high initial bonuses. Levy estimated that in some instances royalties will run as high as 55 cents a barrel as compared to 14 to 23 cents in the older areas. The higher producing cost will be a limiting factor in selling crude in the United States, particularly in the event of a crude price decline in this country.

Levy devoted his address largely to a discussion of the general foreign situation as affected by political issues, governmental attitudes, demands by the Middle East countries for higher royalties, and the current British drive for expansion of oil markets.

"The current shift in the Eastern Hemisphere's oil supply center from the Western Hemisphere to the Middle East would offer extremely great problems even under ideal circumstances, and circumstances are far from ideal," Levy said.

"All this is complicated, expensive, and difficult enough without being further complicated and distorted by the new dollar-sterling problem."

Levy predicted that as Middle East crude displaces Western Hemisphere oil, refined products also will feel the impact of expanded operations in the Eastern Hemisphere, and by 1952 or 1953 only "marginal markets in West Africa and perhaps in a few areas in the Far East" will be left for producers in the Americas who

The HORTONSPHERE

Butanes
$C_4 H_{10}$

Propane
$C_3 H_8$

Pentanes
$C_5 H_{12}$

. . . enables you to store volatile hydrocarbons as liquids

With the Hortonsphere you can store large volumes of highly volatile hydrocarbons like butane and propane as liquids—and do it more economically than you could with any other type container.

There are several reasons why the Hortonsphere is more economical than other types of tanks for pressure storage. It costs less to paint because it has less surface area per barrel of capacity than a container of any other shape. The use of Hortonspheres often reduces piping and fitting costs because a large volume is stored in *one* unit with only *one* set of pipe connections and fittings. It occupies less ground space than would the same volume of storage in horizontal cylindrical tanks. It is easier—and less expensive—to maintain because all parts are readily accessible for inspection and painting (note how the entire structure is supported above the ground on columns).

The Hortonsphere is efficient in other ways too. It prevents all vapor losses of butane and similar products simply by storing them under pressure as a liquid. Instead of venting as the liquid in the tank vaporizes, a pressure builds up on the inside of a Hortonsphere. When this pressure is equal to the vapor pressure of the product being stored, no more of the liquid vaporizes. None of the contents of the tank will escape so long as the pressure in the tank does not exceed the relief valve setting.

You get effective, economical storage when you choose the Hortonsphere to store hydrocarbons like butanes, propane, and pentanes or the more volatile natural gasolines used for blending stocks. For details on working pressures and capacities write our nearest office for Bulletin F.

Above: A 5,000-bbl. Hortonsphere used for butane storage at the Oleum, California, refinery of the Union Oil Company. It operates at a pressure of 75 lbs. per sq. in. and supplies butane for refining operations and for sale as liquefied petroleum gas.

CHICAGO BRIDGE & IRON COMPANY

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PENNSYLVANIA

Atlanta, 3.....2154 Healey Bldg.
Birmingham, 1.....1536 North 50th St.
Boston, 10.....1025—201 Devonshire St.
Chicago, 4.....2128 McCormick Bldg.
Cleveland, 15.....2204 Guildhall Bldg.
Detroit, 26.....1514 Lafayette Bldg.
Havana.....402 Abreu Bldg.
Houston, 2.....2119 National Standard Bldg.
Los Angeles, 14.....1523 General Petroleum Bldg.
New York, 6.....3347—165 Broadway Bldg.
Philadelphia, 3...1615—1700 Walnut Street Bldg.
Salt Lake City, 1..1525 First Security Bank Bldg.
San Francisco, 11..1254—22 Battery Street Bldg.
Seattle, 1.....1325 Henry Bldg.
Tulsa, 3.....1606 Hunt Bldg.

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Chicago Bridge & Iron Company, Ltd., Apartado 1348, Caracas, Venezuela
Compagnia Tecnica Industrie Petroli, Rome, Italy
Whessoe, Limited, Darlington, England
Motherwell Bridge & Engineering Company, Limited, Motherwell, Scotland
Comprimo N.V., Amsterdam—O, Netherlands

last year exported between 500,000 and 600,000 bbl. of products daily.

Also, he said, it is doubtful that Western Hemisphere demand will expand rapidly enough to absorb the surplus that will be developed by the contraction of foreign markets, and warned that the world dollar shortage may make the world oil surplus purely an American surplus unless the currency problem can be solved.

EUROPE

New Refinery Operating

The new Stanlow refinery of Shell Refining & Marketing Co., Ltd., in England went on stream recently, more than a month ahead of its scheduled completion date.

The plant is located near Ellesmere Port, Cheshire. Early this month the main unit consisting of distillation and associated facilities started operations running Middle East crude at its design rate of about 1,000,000 tons a year (about 20,000 bbl. daily). The refinery was begun the first half of 1948 and was not expected to be completed before January at the earliest. Previously the Shell refining installation at Stanlow has had a listed capacity of 16,700 bbl. daily for topped crude and various distillates.

German Oil Discovery

Another oil discovery is reported to have been made in Germany near the sea dike west of Meldorf in the Heide-Meldorf district.

The well M-88 of Deutsche Erdoel-Aktiengesellschaft found production at 4,200 ft. in the Zechstein formation (Paleozoic), and obtained an initial flow of 30 cu. m. (about 190 bbl.) daily of light oil through a narrow 2-mm. (about 0.08 in.) choke. Indications are that the possible productive area extends west into the submerged region.

LATIN AMERICA

Venezuela to Use Gas

A major project for the construction of facilities to utilize Venezuelan gas production is under discussion by E. Holley Poe, natural-gas consultant, and Venezuelan Government authorities.

Poe recently returned to his New York headquarters following a trip to Caracas. Before leaving the Venezuelan capital, he said his talks with government officials and particularly the minister of fomento had been extremely satisfactory.

He said the government was intelligently interested in the problem and in taking the first step in the execution of the plan which calls for delivery of gas to the central part of the country. Poe said that with the government cooperation and understanding his group was in position to carry out the project.

It is understood that both Venezuelan and American capital is involved in the undertaking by which gas would be supplied particularly to industrial concerns. Gas utilization has long been a goal of Venezuelan officials.

SPECIAL REPORT

Trinidad Problem

With per-well production dropping, companies look to deep drilling, more exploratory work to assure supply

ALTHOUGH the over-all drilling and production rate is being maintained, reports on the petroleum industry in Trinidad show a continuation of the trend of a declining production per well.

Statistics for the first half of 1949 prepared by the office of W. N. Foster, petroleum technologist for the Trinidad Government, give the average output per well in June at 26.8 bbl. daily. This compares with an average of 27.4 bbl. daily in 1948 and 28.8 bbl. daily in January 1948.

Coupled with and responsible for this is the increasing number of pumping wells. In June, 1,116 of the island's total of 2,055 producing wells were pumping. Production from these wells was 33.3 per cent of the Trinidad total in June, against a 32.7 per cent in 1948 and 30.7 per cent in January 1948.

Deeper Drilling.—These figures and other data reflect the situation which has caused Trinidad producing companies to devote increasing attention to exploratory drilling in deeper formations. In part, it results from the curtailment and suspension of exploration work during the war.

Despite the slight but steady decline in per well production, Trinidad's total production continues without significant change. The daily average for the first 8 months of this year was 56,314 bbl. daily. August production was about 56,500 bbl. daily. Of this the output of Trinidad Leaseholds, Ltd., the island's major producer, from its own fields only was about 33 per cent.

Trinidad's production in 1948 averaged 54,948 bbl. daily; in 1947 the daily average was about 56,200 bbl. Peak production was reached in 1940 with a daily average of 60,800 bbl. daily, and output was maintained at a relatively high level throughout the war. Up until a year or so ago, Trinidad was the largest producer in the British Empire. It has, however, since been surpassed by British North Borneo.

Well Figures.—During the first 6 months of this year, according to the petroleum technologist's report, 64 wells were completed as producers. The similar figure for the first 6 months of 1948 was 68. Wells started the first half of 1949 totaled 76 against 74 last year. Six wells were abandoned while drilling the first 6 months of this year compared to four in the same period of 1948.

Number of rigs running and total

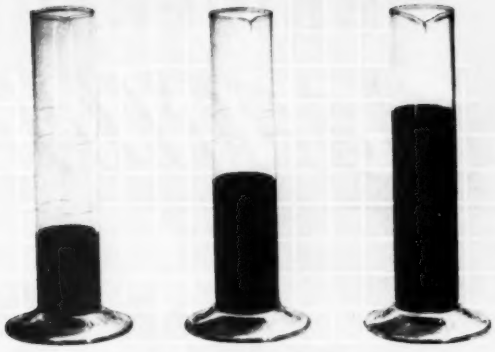
(Continued on page 141)

Changing tour on a drilling rig near Point Fortin, Trinidad

How

Visco Quality

CUTS YOUR EMULSION-BREAKER COSTS



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3 units of a Visco Class I *high quality* formula.

5 units of a medium-priced emulsion breaker.

7 units of a low-priced emulsion breaker.

In each instance, Visco Class I is the highest-priced chemical—but the lowest in cost per barrel of dry oil!

Quantities above were determined from controlled tests in the field and in the Visco Laboratories. Oil treated contained emulsion which could be satisfactorily broken by all three formulas. This proof of the real economy of Visco Quality formulas is even more dramatic on leases where emulsions encountered are more difficult and sometimes impossible to break with lower grade formulas...

You can put Visco Quality to work on your leases promptly—Call Houston, CAPITOL 7300, collect, for fast action. Remember: By paying too little for treating chemical you may be paying far too much for pipeline oil!

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Visco VS was developed for our own use as a solvent for wax, grease, lube oils, paint, oil-treating chemicals, and fusible or soft resins. It is so good, it has been made available to the whole petroleum industry! Will not harm skin, wood or metal. Available now in 5-gallon tins and 55-gallon drums.

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UNIVERSAL REFINING FACTS

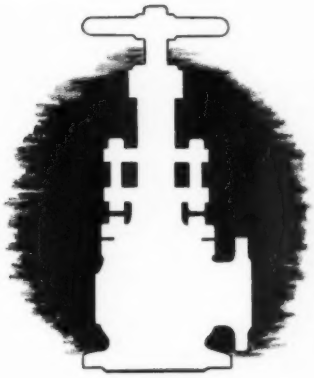
CRACKING UNIT GETS AROUND!

CORPUS CHRISTI—CANOL—EDMONTON! THAT'S THE RECORD LOGGED BY ONE UOP-DESIGNED UNIT. ORIGINALLY INSTALLED IN A TEXAS REFINERY, THE EQUIPMENT IS STILL IN OPERATION TODAY AFTER THOUSANDS OF MILES OF TRAVEL.

MOTOR FUEL WAS NEVER SOLD UNDER A NAME LIKE THIS BUT "HAMMER BRAND" WAS THE TRADE TERM FOR SOME STRAIGHT RUN GASOLINE BECAUSE OF THE KNOCK IT PRODUCED IN AUTOMOBILE ENGINES. UNIVERSAL PIONEERED THE DEVELOPMENT OF CONTINUOUS CRACKING OF HEAVY CHARGE STOCKS THAT MADE ANTI-KNOCK FUELS AVAILABLE AND PUT "HAMMER BRAND" OUT OF BUSINESS.

OIL IS PROGRESS!

LESS THAN 50 YEARS AGO, OIL SUPPLIED ONLY ONE-TWENTIETH AS MUCH OF THE NATION'S TOTAL ENERGY AS DID COAL. TODAY, OIL SUPPLIES MORE THAN HALF AS MUCH AS COAL.



NEW ANGLE!

IN THE EARLY DAYS OF REFINING, GLOBE OR SLIDE VALVES FOR HIGH PRESSURE DROPS REQUIRED CONTINUAL MAINTENANCE. THAT'S WHY UNIVERSAL ENGINEERS WORKED WITH VALVE MANUFACTURERS TO DESIGN THE STREAMLINED ANGLE VALVE FOR HIGH PRESSURE DROPS AND EROSIVE SERVICE . . . STANDARD THROUGHOUT THE INDUSTRY TODAY.

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PERSONALS

Gets Award

Chemical engineering's top honors go to Souders

DR. MOTT SOUDERS, JR., head of the chemical-engineering research section of Shell Development Co., San Francisco, was recipient of the $1,000 Professional Progress Award in Chemical Engineering for 1949 at the annual meeting of American Institute of Chemical Engineers in Pittsburgh last week.

Dr. Souders received the award, established by the Celanese Corp. of America and administered annually by A.I.Ch.E., for his distinguished career in the field and for his "important contribution to separation processes in the petroleum industry."

A native of Red Lodge, Mont., Dr. Souders attended Montana State College and the University of Michigan, where he was given his doctor's degree in chemical engineering. Formerly associated with Smith Engineering Co., Kansas City, Mo., and Yale University, Dr. Souders joined Shell Development Co. in 1937. He has published more than 60 technical papers, holds 20 patents, and is perhaps best known in the chemical-engineering field for his method of calculating the size of a fractionating column. The Souders method of design has been widely used for more than 20 years in the refining industry.

V. R. Lay, tool pusher for Wheless Drilling Co. at Ruston, La., has been transferred to the Jacksboro, Tex., area in the same capacity.

Joe Tracy Williams, seismograph party chief for Carter Oil Co. at Ardmore, Okla., has been moved to Eufaula, Okla., in the same capacity.

Prentis L. Boatner, Jr., geologist at Tulsa, has been transferred in a similar capacity to the Shreveport offices.

Don Murphree, geologist for British American Oil Producing Co. at Casper, has been transferred in a similar capacity to Houston.

Arthur W. Kincade, president of the Fourth National Bank of Wichita, has been named chairman of the board of directors of the newly organized Texas Consolidated Oils, Inc. He will maintain his residence in Wichita and continue as president of the bank. Texas Consolidated, which controls producing properties in the Mid-Continent, New Mexico, and California areas, has headquarters in Dallas.

R. W. Farlee, district geologist for Shell Oil Co. at Tallahassee, has been transferred in a similar capacity to the company's Jackson, Miss., offices. Other changes within the firm's producing department include: **H. F. Simmers,** drilling foreman, Delta district, moved to the Franklin, La., division in the same capacity; **C. R. Schriber,** drilling foreman, Franklin division, moved to the Donaldsonville, La., division in the same capacity; **D. M. Obermier,** field mechanical superintendent at Monroe, La., transferred to Lake Charles; and **T. O. Whaley,** formerly rotary driller's helper, named driller in the Delta district.

Kyle Colvin, formerly of the Victoria, Tex., district, Houston Natural Gas Corp., has been named manager of the company's Alice, Tex., district, with headquarters in Alice.

James E. Thomas, petroleum engineer for Stanolind Oil & Gas Co. at Rangely, Colo., has been named mechanical engineer at the company's Elk Basin gasoline plant, Elk Basin, Wyo.

W. R. Canada, geologist at Lake Charles, La., for Magnolia Petroleum Co., has taken over his new duties as district geologist for the company's Houston-Lake Charles-Morgan City, La., districts, with headquarters in Houston.

G. R. Brown, district petroleum engineer for The Texas Co. at Wichita Falls, Tex., has been transferred to Midland as engineer for the West Texas-New Mexico district.

Albert G. Hoge, assistant superintendent of operations for Mississippi River Fuel Corp., St. Louis, has retired from the company.

W. M. Schul, division production superintendent at Great Falls, Mont., for Phillips Petroleum Co., has been moved to Cut Bank, Mont., as production superintendent for that division.

V. V. Thomasson, formerly assistant drilling superintendent for Barnsdall Oil Co. at Shreveport, has joined B-B-M Drilling Co. at Snyder, Tex., as drilling superintendent.

P. J. McClellan, field foreman at Benjamin, Tex., for Ohio Oil Co., has been moved in a similar capacity to the Bay City, Tex., area.

Duncan K. Foulds has been appointed natural-gas engineer for Texas Gas Transmission Corp., and **Monty G. Martin** has been named geologist. Both will be attached to the firm's new Shreveport office. Foulds formerly was with Transcontinental Pipe Line Corp., and is a graduate petroleum engineer from University of Texas. Martin previously was with Carter Oil Co. and is a graduate of Oklahoma University.

D. K. FOULDS

M. G. MARTIN

O. I. Jantz, seismograph party chief for Amerada Petroleum Corp. at Three Rivers, Tex., has been transferred to the Cotulla, Tex., area as party chief.

Robert B. Tenison, formerly general superintendent of Oklahoma for James H. Snowden et al., with headquarters in Oklahoma City, has been transferred to Midland, Tex., as chief engineer.

Jerry Covington, field geologist for Humble Oil & Refining Co. in the Van Horn, Tex., area, has been transferred in a similar capacity to the Midland, Tex., area.

H. W. Mitchell, driller for Shell Oil Co. at Sulphur Springs, Tex., is now serving the company in that capacity at Alice, Tex.

Roy Stewart, independent drilling contractor and oil producer of Jeromesville, Ohio, has moved his headquarters to Ashland, Ohio.

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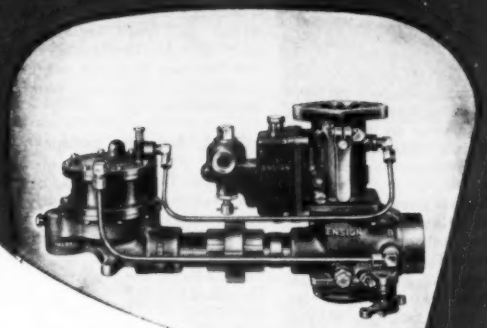

SERVICE is a big word at Ensign's. Part of our responsibility, we feel, is keeping the ever-growing parade of oil field personnel well supplied with gas engine and carburetor information.

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PERSONALS

Jean E. Joujon-Roche, Sr., engineer in the regional production department, Shell Oil Co., Los Angeles, has been appointed supervisor of training and safety for the company in the Los Angeles area.

B. P. Newton, vice president in charge of foreign marketing operations for Gulf Oil Corp., will retire at the end of this month, after 25 years of company service. He will also relinquish his positions as vice president and a director of Gulf Refining Co., vice president of Gulf Research & Development Co., and a director of 10 subsidiary foreign-marketing companies, and Kuwait Oil Co., Ltd.

B. H. Ullom, tool pusher at Marksville, La., for Penrod Drilling Co., is now at Scurry County field in Snyder, Tex., serving in the same capacity. **H. F. Staggs,** tool pusher for the firm at Big Lake, Tex., has been transferred to Midland, Tex.

Warren L. McCabe, vice president and director of research for Flintkote Co., was elected president of American Institute of Chemical Engineers for 1950 at the institute's annual meeting in Pittsburgh. Other officers elected were: **T. H. Chilton,** technical director of the development-engineering division, E. I. du Pont de Nemours & Co., vice president; **S. L. Tyler,** New York City, reelected secretary; and **C. R. DeLong,** New York City, reelected treasurer. Four new directors were chosen: **C. G. Kirkbride,** vice president in charge of research and development, Houdry Process Corp., Marcus Hook, Pa.; **W. G. Whitman,** head of the department of chemical engineering, Massachusetts Institute of Technology, Cambridge, Mass.; **G. E. Holbrook,** assistant director, technical division, organic-chemicals department, du Pont; and **R. L. Murray,** executive vice president, Hooker Electrochemical Co., Niagara Falls, N. Y.

K. L. Mehrens, purchasing agent at Los Angeles for Superior Oil Co., has been transferred to Houston as purchasing agent for the Mid-Continent division.

Robert R. Smart, geologist at Vernal, Utah, for General Petroleum Corp., is now serving in that position at the firm's Durango, Colo., office.

Daniel L. Hussey, process superintendent, and **W. Selby Harney,** assistant head of the refinery laboratory at Esso Standard Oil Co.'s Bayway refinery, Linden, N. J., have been assigned temporarily to duty at the Aruba, West Indies, refinery of the affiliated Lago Oil & Transport Co., Ltd. During their absence from Bayway, **Everett F. McTernan** will become process superintendent; **Warren C. Wilson** will head the distillation and cracking department; **Caleb E. Hodges** will act as assistant head of the refinery laboratory; **James A. Simpson** will work as assistant head of the Paratone laboratory; and **Lynn J. Myers** will head the gas-laboratory division of the refinery laboratory.

L. E. Hess, petroleum engineer with Socony-Vacuum Oil Co., Inc., has been transferred from the Latin American organization to the company's operation in Egypt.

J. D. Morris has resigned as chief geologist for Derby Oil Co., and will enter the independent consulting field. He will maintain headquarters in Wichita.

J. W. Sutton, former district superintendent for Shell Oil Co. in East Texas and more recently personnel and industrial-relations manager in the Houston area, has been appointed as division production manager, Kansas division.

J. M. Bradley, technical assistant to the president of Interstate Oil Pipe Line Co., Tulsa, has been elected a director of the company, and assumes the board position vacated by **M. A. Wright,** New York City, who recently was made deputy coordinator of production for Standard Oil Co. (N. J.).

Emery Carper, Artesia, N. M., independent oil man, was reelected president of the New Mexico Oil and Gas Association, at the group's twenty-first annual meeting in Albuquerque. Other officers elected include: **Van S. Welch,** vice president; **John M. Kelly,** treasurer; and **Jack Danglade, Emmett White, Joe Lackey, Dudley Cornell, Jim Dunlavey, Ralph Hendrickson,** and **Bill Macey,** named to the executive committee.

Refinery executives and technicians from companies operating in Texas, Oklahoma, Kansas, and East and West Coast areas, are shown ready to board a plane for Big Spring, Tex., to inspect a new catalytic cracking unit of Cosden Petroleum Corp. Left to right: W. H. Grosse, Universal Oil Products Co.; T. M. Lumly, Refinery Engineering Co.; T. B. Randall, Midland Cooperative Wholesale; L. G. Molique, Phillips Petroleum Co.; R. W. Griffith, Barnsdall Oil Co.; C. C. Tate, Phillips Petroleum Co.; T. J. Williams, Roosevelt Oil & Refining Co.; F. Frey, Johnson Oil & Refining Co.; C. L. Barker, Tide Water Associated Oil Co.; W. J. Leenhouts, Johnson Oil & Refining Co.; R. W. Davis, Deep Rock Oil Corp.; Harold Bottomley, Refinery Engineering Co.; R. B. Tuttle, The Oil and Gas Journal; and D. O. Givens, Refinery Engineering Co. F. A. Deering, Kanotex Refining Co., and P. M. Waddill, Phillips Petroleum Co., are standing on the steps of the loading ramp. Others who joined the inspection party en route were: Cliff Wise, Kerr-McGee Oil Industries, Inc., W. M. Miller, Jr., Mercury Oil Refining Co., and J. O. Walkup, Waggoner Estate Refinery; Marvin McMurrey and O. C. DeLoach of McMurrey Refining Co., and C. L. Withers, New Mexico Asphalt & Refining Co., joined the group at Big Spring

C. A. P. Southwell has been nominated as president for the 1950-51 session of Council of the Institute of Petroleum, London. He is managing director of Kuwait Oil Co., Ltd., and formerly manager of fields and geological branch, Anglo-Iranian Oil Co., Ltd. Southwell was elected to the institute's council in 1936 and was made a vice president in 1948.

Burr M. Roberts, geologist for Bishop Oil Co. at Abilene, Tex., has been transferred to Calgary, Alta., Canada, as geologist in charge of the newly established offices of the company there.

Wallace Corwin, assistant manager, producing department, Socony-Vacuum Oil Co., Inc., was to return to New York in mid-December following a 3-month trip in Europe and Egypt.

L. O. Thompson, formerly district geologist in West Texas for Slick-Urschel Oil Co., has joined Heyser & Heard, independent operators, with headquarters in Midland. Before joining Slick-Urschel, Thompson was with the geological department of Standard Oil Co. of Texas.

B. E. Groenewold, Exploration Drilling Co., was selected chairman of the Tulsa chapter, American Association of Oilwell Drilling Contractors. Other officers include: **A. F. Keating,** Keating Drilling Co., vice chairman; and **Robert L. Parker,** Parker Drilling Co., secretary. Retiring officers are **Frank Stickle,** chairman; **Jack Milhoan,** vice chairman; and **H. E. Wolford,** secretary.

W. F. Brown, Dowell Incorporated, was elected chairman of the Kansas section, American Institute of Mining and Metallurgical Engineers at a recent Wichita meeting. Other officers named include: **Fred Kluck,** Ohio Oil Co., Eureka, vice chairman for eastern Kansas; **W. R. Warren,** Stanolind Oil & Gas Co., Ellinwood, vice chairman for western Kansas; **P. T. Amstutz, Jr.,** Amstutz & Yates, Inc., vice chairman for Wichita; and **Louis Chombart,** Schlumberger Oil Well Surveying Co., secretary-treasurer. Directors include: **Carl Temple,** Sohio Petroleum Co., Independence; **Herb Roberson,** Dowell Incorporated, Great Bend; and **Lester Wilkinson,** Sunflower Natural Gas Co., Wichita.

W. T. Crowder, Jr., Longview, Tex., with Lufkin Foundry & Machine Co., has been elected chairman of the East Texas chapter of American Petroleum Institute, division of production, succeeding **B. F. Patterson, Jr.,** of Gladewater. Other officers are: **W. M. Jones,** Longview; **George Holman,** and **H. L. Long,** both of Kilgore, vice chairmen; **W. A. Holland,** Kilgore, secretary-treasurer; and **R. V. Shoemaker,** Kilgore, assistant secretary-treasurer.

Newly elected officers of the Panhandle Chapter, American Petroleum Institute. Left to right: Leo Frye, engineer, Stanolind Oil & Gas Co., second vice chairman; Max Harbison, Kewanee Oil & Gas Co., chairman; Fred Neslage, pool engineer for West Pampa Repressuring Association, first vice chairman; and Clayton Husted, partner in a Pampa, Tex., trucking concern, secretary-treasurer

E. B. Wilson, district geologist at Tyler, Tex., for Sun Oil Co., has been transferred to Roswell, N. M., to head the geological department in that area. **O. L. Hill** and **A. H. Talley,** geologists in the Dallas office, have been transferred to Tyler.

SHIFTS—

V. V. Thomasson, superintendent, Barnsdall Oil Co., Bronte to Snyder, Tex.; **William G. Allen,** foreman, Keystone Exploration Co., Seymour to Jacksboro, Tex.; **Thornton Tarvin,** superintendent, Loffland Brothers Co., Bay City, Tex., to New Iberia, La.; **Byron W. Berthelot,** engineer, Phillips Petroleum Co., Borger to Phillips, Tex.; **Don R. Boling,** engineer, Skelly Oil Co., Carthage, Tex., to Athens, La.; **W. M. Phillips,** Phillips Petroleum Co., Goldsmith, Tex., to Jal, N. M.; **Joe Lee Terry,** geologist, Houston Oil Co., Lubbock, Tex., to Houston; **J. R. Willis,** superintendent, Holmes Drilling Co., Victoria to Raymondville, Tex.

S. O. Wood, Jr., engineer, California Co., Washington, Miss., to Ardmore, Okla.; **P. E. Busch,** engineer, Great Lakes Pipe Line Co., Kansas City, Mo., to Shreveport; **R. V. Mertz,** engineer, Stanolind Oil & Gas Co., Denver to Tulsa.

Robert R. Hawkins, engineer, Signal Oil & Gas Co., Los Angeles to Pismo Beach, Calif.; **F. D. Parker,** engineer, F. D. Parker & Co., Los Angeles to Boston; **P. J. McClellan,** Ohio Oil Co., Benjamin to Bay City, Tex.

DEATHS

Frederick George Bannerot, 74, president of United Oil Co., died at his home in Pittsburgh December 2. He was also president of United Refining Co., Warren, Pa.; vice president and treasurer of Elk Refining Co., Charleston, W. Va.; and a director of Tiona Petroleum Co., Philadelphia, and Emblem Oil Co., Warren.

Robert C. Engleman, assistant chief engineer for Clark Brothers Co., Inc., Olean, N. Y., died November 30.

George W. Stroup, 52, Tulsa, assistant purchasing agent for Tide Water Associated Oil Co., died December 6. He was with Oklahoma Producing & Refining Co. until 1924.

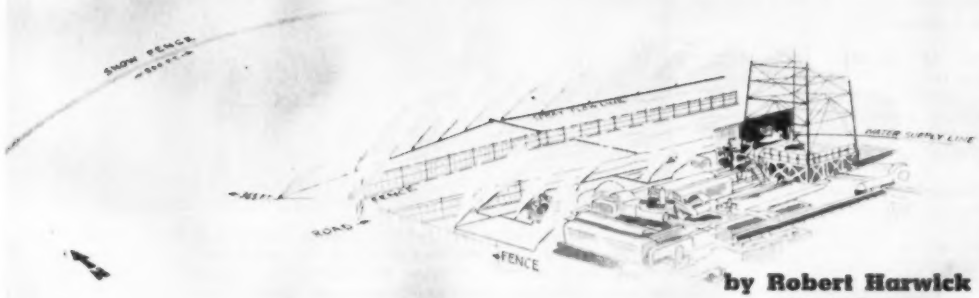
Charles C. Holcomb, 56, independent drilling contractor, died December 7 in Wichita Falls, Tex.

Charles E. Foster, 71, a retired vice president of Cities Service Oil Co., died December 7 in St. Joseph, Mo. He was vice president in charge of marketing operations for the firm when he retired in 1945.

Victor J. Henke, 37, employe in the gasoline plant at The Texas Co. refinery in West Tulsa, died December 9.

Ray H. Hall, 50, head geological draftsman for Sohio Petroleum Co. at Mount Pleasant, Mich., died December 7.

Severe Dust Storms Major Drilling Problems at Lost Hills, California



by Robert Harwick
District Editor

Snow fences and water spray are used to help keep dust problems to a minimum as shown in the artist's drawing above. A line of spray nozzles is installed at a distance from the rig and several are placed near drilling machinery

LOST HILLS field in Kern County, California, is well named. It is one of those places on the earth where nature has conspired, above and below the surface, to make things tough for the driller.

Above, the earth is barren, the temperature hot, the air dry and subject to blinding dust-sand storms that rise suddenly and last long. Below there is a 1,000-ft. interval of punky and diatamaceous shale that seems especially designed to absorb drilling mud. Beyond this shale there is 6,000 ft. or more of strata containing great amounts of hot salt water at high head.

The water is exceedingly difficult to control. In some cases where flow of this salt water has run out of control, the flow has topped 100,000 bbl. a day. The history of the area is replete with records of wells abandoned in this zone because of drilling problems.

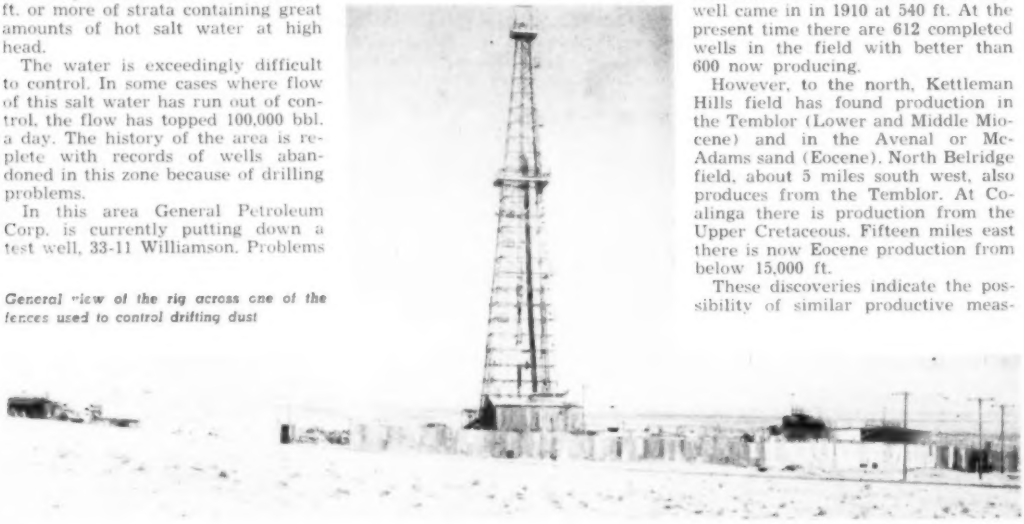
In this area General Petroleum Corp. is currently putting down a test well, 33-11 Williamson. Problems encountered so far have been costly in material and hazardous to the men. The test was spudded June 5 and at last report October 28, was drilling ahead in sand and shale beyond 5,500 ft.

The Lost Hills structure consists of a narrow, elongated anticline. The anticline is definitely suggested by a long, narrow ridge that runs in a southeast direction, rising about 120 ft. in an otherwise level valley. The slope of the rise is quite gentle with most of production found on the southeast nose. The fold itself is slightly asymmetrical as evidenced by well and seismograph data, with the axis heading west.

Present interest in Lost Hills field is largely the result of drilling in other San Joaquin Valley fields. Lost Hills production, so far has been relatively shallow with deepest production around 2,500 ft. The field has produced about 63 million barrels from three zones since the discovery well came in in 1910 at 540 ft. At the present time there are 612 completed wells in the field with better than 600 now producing.

However, to the north, Kettleman Hills field has found production in the Temblor (Lower and Middle Miocene) and in the Avenal or McAdams sand (Eocene). North Belridge field, about 5 miles south west, also produces from the Temblor. At Coalinga there is production from the Upper Cretaceous. Fifteen miles east there is now Eocene production from below 15,000 ft.

These discoveries indicate the possibility of similar productive meas-



General view of the rig across one of the fences used to control drifting dust

Left: Tool pusher W. R. Smith wearing a full-face respirator—used during severe dust storms

Right: Road to the well during a storm. Sand has drifted more than a foot deep on the right side of the road

Below: Spray line as presently installed. Sand has been piled up by the water spray

ures in the Lost Hills area of the San Joaquin Valley. All operators in the area are naturally highly interested in the test and most of the group have dry-hole money involved.

How far the Williamson well will carry is difficult to tell at this time, but it is planned as a deep test. For this area a deep test would mean at least 11,000 ft. At present depth the sand and shale formations are of proper Temblor age. The Belridge "64" sand, which conformably underlies the Temblor, has not yet been reached.

The General Petroleum rig in use on this site is capable of reaching at least 15,000 ft. and is the company's heaviest diesel-powered rig. Rated power for drilling and hoisting is 950 with 1,750-hp. pump drive.

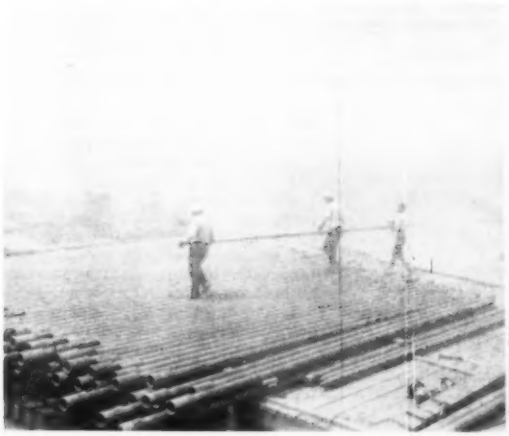
To date some 10 tests have been drilled which have reached the Temblor formations in this field. All were unproductive although logging various amounts of oil stained sands separated by layers of shale. The majority of these tests did not top their planned objective because of drilling difficulties. In general the holes topped the Temblor around 4,500 ft.

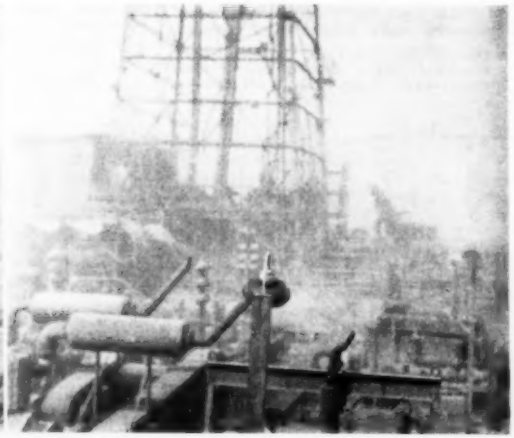
At least one well at Lost Hills reached the Eocene, topping the Kreyenhagen shale at 9,130 ft. This test was also unproductive. However, this test was located on the south nose of the structure and is now believed to be low structurally. Indications are that the General Petroleum test is better located than previous Temblor-Eocene tests in this field.

The General Petroleum crew working on the Williamson well were plagued by difficulties right from the time of spudding in. Sand storms,

(Continued on page 71)

Left: Racking pipe during one of the dust storms. Work continues during the lighter storms. Right: View of the drilling machinery during one of the sand storms





PRESSURE-SURGE TESTS

on oil pipe lines

by John E. Green*

THIS paper describes the field test work, the results, and the conclusions of a pressure-surge investigation which was made by a committee organized by several of the companies which have interests in the proposed large-diameter Middle East pipe lines. . . .

Field tests were performed on three pipe lines, viz.: (1) a short 4-in. crude-oil gravity line; (2) a 20-mile section of a 6-in. crude-oil line, both belonging to Shell Pipe Line Corp.; and (3) a 53-mile section of a 10-in. products pipe line belonging to Plantation Pipe Line Co.

Four-inch gravity-line tests. — The test line was located on the side of King Mountain, north of McCamey, Tex. As seen in Fig. 1, the line was 2,252 ft. long, with 330 ft. of fall; and the flow was from tank to tank.

The planned tests included various rates of valve closure and opening at various rates of flow. The valve-closure times were always a multiple of the time required for the wave to travel the length of the line. The valve was operated at rates which produced linear changes in velocity with time. The tests were divided into three groups as follows:

1. Closure of valve "B."
2. Opening of valve "B."
3. Closure and subsequent reopening of valve "A."

Six-inch trunk-line tests.—A line extending from Wink to Monahans, Tex., was the site of the second series of tests. Like the work at McCamey, the tests were made with various valve-closure rates and stream velocities. The tests were divided into two groups:

1. Closure of the valve at the terminal end of the line, with gravity flow at stream velocities of 0.5 and 1.0 ft. per second.
2. Valve closure at the terminal end of the line, with a centrifugal pump producing the flow.

The centrifugal pump, a 3,600-r.p.m. three-stage-type, produced a 1,425-ft. head at 380 g.p.m. and 1,400 ft. at zero flow. Stream velocity with the pump was 380 g.p.m. 4.32 ft. per second. Pressure was recorded at the quarter-points of line, and flow was recorded at the terminal end only, as seen in Fig. 2.

The Plantation surge tests.—A 53-mile section of 10-in. products line in South Carolina, with three centrifugal pump stations operating in a "closed system," was selected for the last series of tests. The tests were divided into two main groups:

1. Individual-station operation.
2. Over-all line operation.

Fig. 3 shows the layout of the pump station and test equipment. The operations observed were:

1. Shutdown of both pumps simultaneously, leaving motorized valves on both pumps open.
2. Shutdown of No. 2 pump when both pumps were operating.
3. Normal station startup: No. 2 pump brought on line, then No. 1 pump.

In the group of tests, the effects of station startup and shutdown on ad-

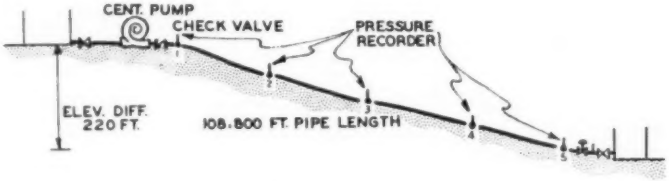


Fig. 2—Layout of Wink-Monahans 6-in. trunk line surge-test section

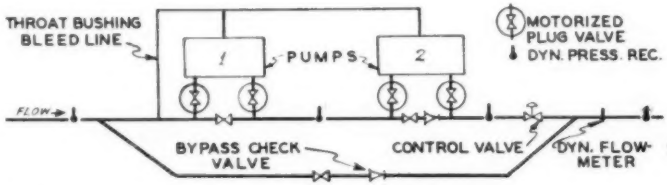


Fig. 3—Layout of pumps and test equipment for individual-station tests on Plantation Pipe Line

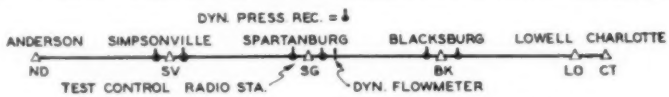


Fig. 4—Schematic diagram of surge-test section used in over-all line tests

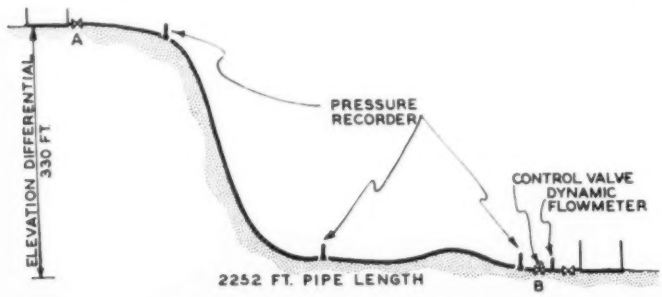


Fig. 1—Layout of the McCamey 4-in. gravity line

*Shell Pipe Line Corp., Houston, Tex. Summary of paper given at 29th annual meeting, A.P.I., Chicago, Nov. 8, 1949.

jacent stations were observed. Pressures were measured on both the suction and discharge sides of the three test stations, whereas flow was measured at the middle station only, as seen in Fig. 4. Bypass check-valve clapper and control-valve positions were also recorded at the middle station. The tests made were:

1. Shutdown and startup of SV.
2. Shutdown and startup of SG.
3. Shutdown and startup of BK.
4. Operation of reciprocating sump pump at each station; main line in normal operation.

Test Instrumentation

Pressure recorders. — Pressure was measured with a strain-gage-type pickup connected to the pipe line by a short length of pipe to minimize all lags. Used in conjunction with the pickup was a bridge amplifier designed by Shell Development Co. The bridge output drove an oscillograph.

Flow meter.—Flow was measured in the same manner as was the pressure. A 4-psi. strain-type differential-pressure pickup measured the drop across an orifice in the oil line. Steady-state flow was measured with a manometer.

Valve-element position. — Position of the check-valve clapper and of the control-valve plug was measured and recorded by a potentiometer direct-inking oscillograph arrangement.

Radio for timing and communication.—Radio transmitter-receivers were located at each test station to allow coordination of all records to a common time. Time signals, transmitted by the control station every second, were recorded on every oscillograph record. The radio also provided communication between stations to facilitate tests. . . .

The tests in which the reciprocating sump pumps were operated showed the fluctuating pressure imposed on the suction pressure at the station where the sump pump was operated, but this fluctuation was neither recorded at station discharge pressure nor observed at the adjacent stations.

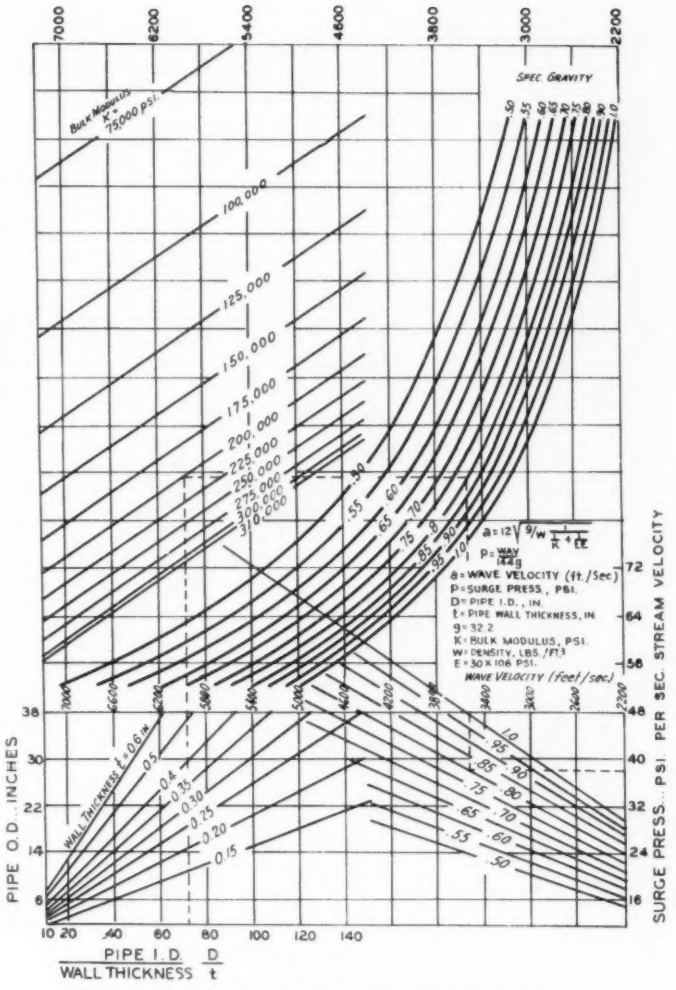


Fig. 6—Surge velocity and pressure for steel pipes

Conclusions

Origin of pressure surges.—Surges are created by a change in velocity of a flowing liquid column. The surge is actually an energy transformation, i.e., kinetic to potential energy in the case of a decelerating stream, potential to kinetic if the stream is accelerating. The potential energy level is measured by the static pressure, and represents the amount of compression of the fluid and stress in the containing pipe. Velocity changes tend to set the entire flowing column to oscillation.

The origin of a surge is most easily illustrated by a simple pipe line (Fig. 5) consisting of a reservoir, a length of pipe, and a valve at the end of the pipe. If the valve is opened, liquid would flow through the pipe at a rate depending on reservoir head and the flowing head loss through the pipe and valve. When flow is steady, suppose the valve is closed instantaneously, thus reducing the velocity of the liquid immediately on the upstream side of the valve to zero: The kinetic energy of this portion of the moving column is thus converted into potential energy, i.e., the pressure increases. This is the origin of a surge. Now with the pressure rise, however, there is a decrease in the liquid volume due to the compressibility of the liquid.

The compressing of the liquid at the valve allows the rest of the column to continue, momentarily, to flow normally; but, as liquid moves in to occupy the space created by compression, more of the column is

Fig. 5

brought to rest with the accompanying increase in pressure. Thus a "wave" progresses toward the reservoir until the entire column is at rest and at an increased pressure. Then the reverse of this process occurs, and the liquid re-expands—flowing back into the reservoir.

The "reverse flow" wave travels from the reservoir to the valve, with pressure along the line returning to original level—friction being neglected. As the reverse flow reaches the valve, a negative wave or wave of rarefaction is generated as the reverse flowing stream attempts to flow away from the closed valve. The negative wave travels to the reservoir, and is reflected to the valve to complete one surge cycle. This cycle is repeated until the kinetic energy of the moving column is dissipated and the column is at rest at its static condition.

The instantaneous valve closure is used purely as an illustration; any change of velocity, either increasing or decreasing, creates a surge. If flow is not stopped completely, as in the case of the illustration, then the oscillating motion of the liquid column is superimposed on the existing forward motion of the stream.

Velocity of wave propagation.—The Joukowsky equation for wave velocity, based strictly on the theory of elastic waves, was found to be applicable without alteration:

$$a = 12 \left[\frac{g}{w} \left(\frac{1}{1/K + D/tE} \right) \right]^{1/2}$$

where:

a = wave-velocity, ft. per second.
g = acceleration of gravity, 32.2 ft. per second per second.
w = weight of the flowing liquid, lb. per cu. ft.
K = bulk modulus of the liquid, psi.
D = diameter of the pipe, in.
t = pipe-wall thickness, in.
E = Young's modulus of the pipe material, psi.

In actual operation, the bulk modulus might be difficult to measure or evaluate because of variations of temperature and characteristics of the oil in a long pipe line. Also, the average pipe-wall thickness might be questionable, as well as the earth effects on a buried line. If the pipe is encased rigidly, both the t and E terms in the Joukowsky equation might be affected. Earth effects, however, are usually negligible. If one or more of the K, t, or E terms are questionable, it may be possible experimentally to evaluate the term (1/K + D/tE) by creating a small flow change at one point on the pipe line and measuring the elapsed time until the flow change or resultant pressure change is observed at another point. The term (1/K + D/tE) might well be called the "system modulus" or "pseudo-modulus."

In Fig. 6 a nomograph is given with which wave velocity, a, can be calculated for steel [E = (30) (10)⁶] pipes up to 38 in. in outside diameter with wall thickness up to 0.6 in. for a liquid bulk-moduli range from 75,000 to 310,000 psi. and a specific gravity of from 0.5 to 1.0.

A term quite freely used in the literature on surges is 2 L/a, which denotes the period of time required for a wave traveling at a ft. per second to travel from the point of origin to a point of reflection, a distance L ft., and return to the point of origin.

Reflection of pressure surges.—Surges were found to reflect at closed valves and at points where the liquid was not completely confined, such as open tanks, line leaks, and gas or vapor pockets. Partly closed valves, orifices, centrifugal pumps, and short sections of different diameter pipe were observed to cause no reflections with the low-frequency surges created during the tests.

All surges are created by a change in velocity, and reflections occur where there is either an absolute or a relative change in the direction of flow.

Magnitude of surge pressure.—The magnitude of the pressure resulting from a stream-velocity change depends on:

1. Velocity of wave propagation.
2. Specific gravity of the liquid.
3. Change in velocity during the time required for the wave to travel from point of or to the point of reflection and return, 2 L/a.

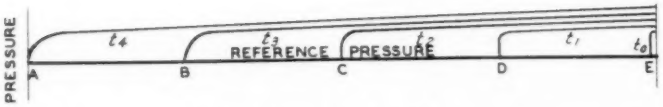


Fig. 7A—Initial or incident pressure wave on pipe line AE shown at five time intervals following instantaneous valve closure at Station "E." Note decreasing slope of front as wave progresses along line

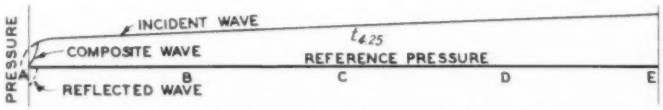


Fig. 7B—Initial wave reflecting from open end line at "A"

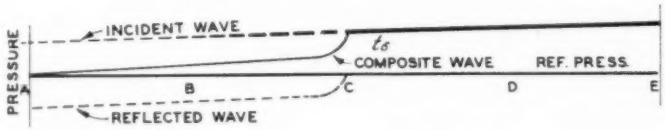


Fig. 7C—Surge wave reflected to midpoint of line

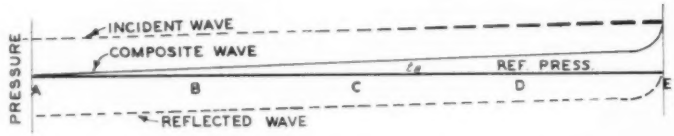


Fig. 7D—Reflected surge wave returned to point of origin station "E"

The magnitude, which is independent of the length of the line, depends entirely on the kinetic energy per linear foot of the flowing stream.

The surge pressure may be calculated by the equation:

$$P_s = \frac{waV}{144g}$$

where:

P_s = surge pressure, psi.
w = weight of liquid per cu. ft., lb.
V = velocity change, ft. per second.
g = 32.2 ft. per second per second.

The surge pressures measured during the field tests were within 5 per cent of the pressures calculated by this method.

As a rule of thumb, surge pressure on oil lines amounts to about 45 psi. per foot per second of stream-velocity change. The magnitude of a surge may be taken as 45 multiplied by the feet-per-second change in stream velocity during a period of 2 L/a seconds or less.

In design computations, it is well to allow a surge factor, in pounds per square inch, equal to 45 or 50 times the maximum expected stream velocity. A line so designed should be capable of withstanding an inadvertent instantaneous valve closure.

(Continued on page 78)

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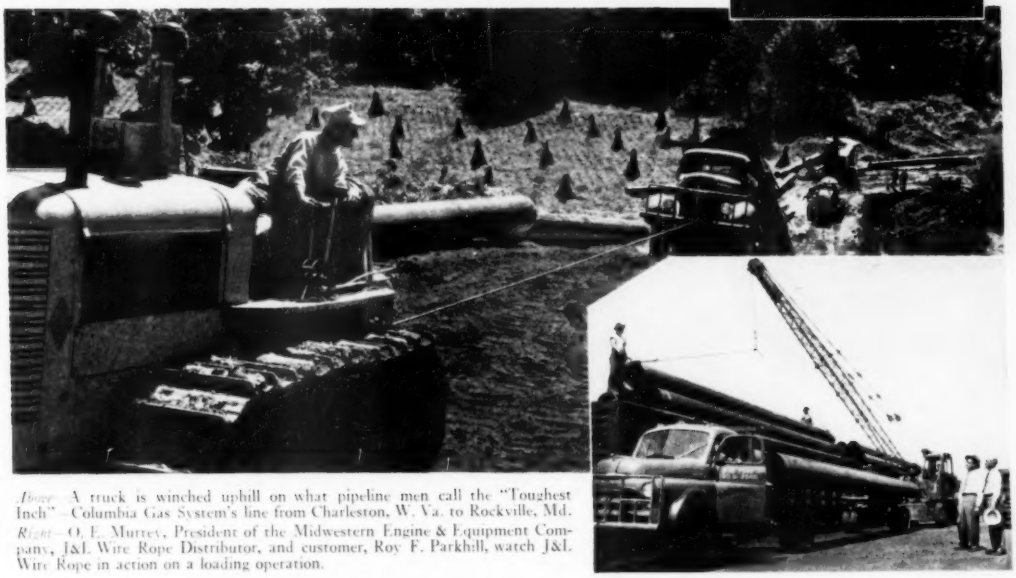

Above—A truck is winched uphill on what pipeline men call the "Toughest Inch"—Columbia Gas System's line from Charleston, W. Va. to Rockville, Md. *Right*—O. E. Murrey, President of the Midwestern Engine & Equipment Company, J&L Wire Rope Distributor, and customer, Roy F. Parkhill, watch J&L Wire Rope in action on a loading operation.

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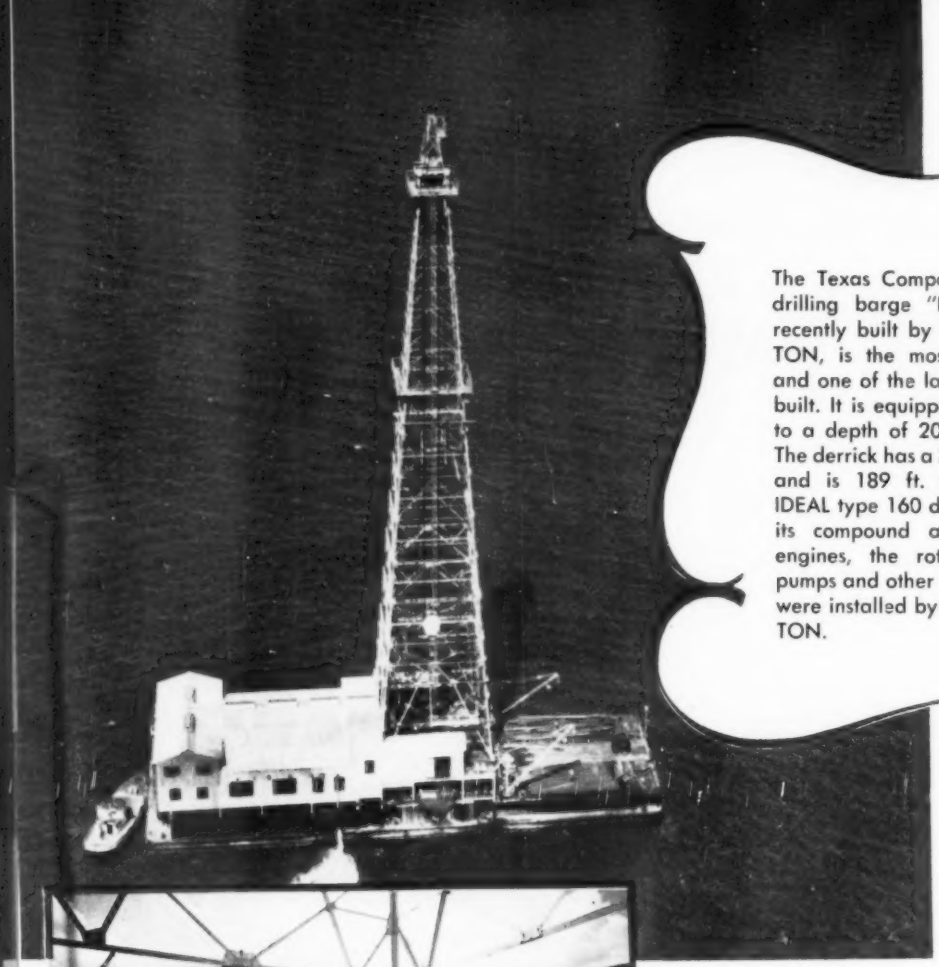

The Texas Company's new drilling barge "RHODES", recently built by LEVINGSTON, is the most modern and one of the largest ever built. It is equipped to drill to a depth of 20,000 feet. The derrick has a 37 ft. base and is 189 ft. high. The IDEAL type 160 drawworks, its compound and diesel engines, the rotary, mud pumps and other machinery were installed by LEVINGSTON.

A view of the derrick floor.

Levingston will quote lump sum price (turn-key job) for any size and type of drilling barge, using the owner's old drilling equipment or new drilling equipment of the owner's choice.

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World's Largest POWER-RIG DRILLING BARGE

now making hole on initial location for Texas Co. in Coastal Louisiana

by Leigh S. McCaslin, Jr.

First location for Texaco's new barge rig—one of the largest in the world—is this site in Lake Barre field some 60 miles southwest of New Orleans. This is the first power rig for the company's Louisiana division which has heretofore found it cheaper to use steam

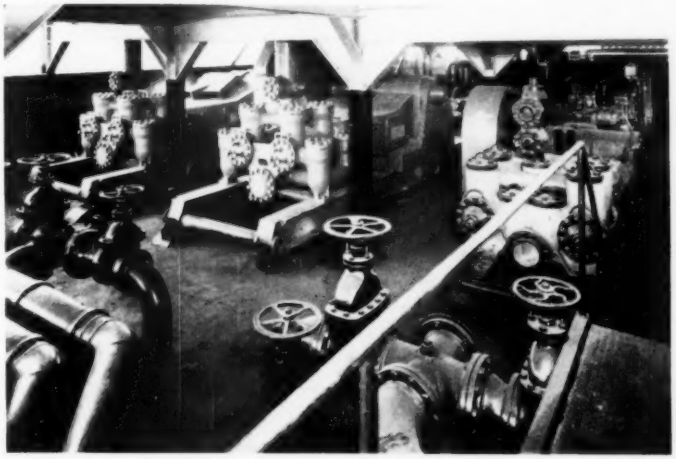
A LARGE modern drilling barge "Rhodes"—first power rig for The Texas Co.'s Louisiana division — is now making hole on its initial location. Reason for the switch from steam to power, according to company officials, is the increasing price of natural gas.

In addition to being the division's first power rig, the unit has the distinction of being the largest barge-mounted diesel power drilling rig in the world. It is a sister rig to the one which drilled the world's deepest hole (20,521 ft.) for Superior Oil Co. in Wyoming a few months ago.

First hole for the big rig is in Lake Barre, Terrebonne Parish, coastal Louisiana. Scheduled depth for this "shake down" well is 13,000 ft. For subsequent drilling, Texaco has two things in mind. First, drilling farther out on some of the salt domes where gas sands have been found. It is hoped that oil will be discovered at these deeper depths on the flanks of the domes. In the second place, the big rig is ideally suited for the deep drilling which Texaco does in Queen Bess Island field of Jefferson Parish, Louisiana. A number of wells have been drilled below 15,000 ft. in this field.

The barge Rhodes was designed by Edwin M. Curtis, Sr., consultant of Beaumont. Builder of the barge was Levingston Shipbuilding Co. of Orange. The petroleum-engineering department, Louisiana division, The

Almost 2,000 hp. is provided by these four six-cylinder, supercharged, dual-fuel engines. Most swamp rigs have only three engines—an added margin of safety is provided by the extra engine



Two 8½-by-16 slush pumps, rated at 700 hydraulic horsepower, and a 7¼-by-12 mud-mixing pump handle the mud. Note the flush decks and ample working space around the pumps

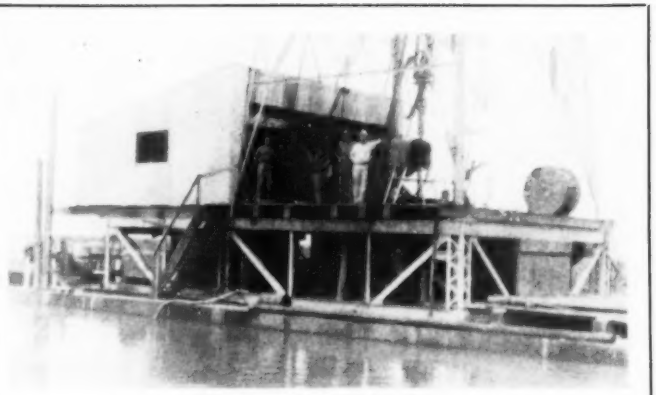
Texas Co., selected and supervised the installation of the drilling equipment. R. L. Keyes is division manager for The Texas Co.'s producing department, Louisiana division. Division petroleum engineer is J. A. Battle; Spencer Rowan and R. A. Abbott were petroleum engineers on the job handling equipment design.

Barge Design

The big slotted-type barge measures 170 by 54 by 12 ft. and can drill in 6 to 12 ft. of water. It is provided with double-deck living quarters so that the drilling crews can live aboard, if necessary. This feature is a little unusual for swamp drilling barges. Normal procedure is to work the crews on 12-hour shifts and transport them back and forth daily from a field camp. Actually, Texaco plans to follow this same procedure with its new barge, normally, but wants living quarters available, if needed. Since the barge will no doubt be drilling some deep wildcat holes, there will be critical stages in the drilling of some holes where it will be advisable to keep crews aboard full time.

In the design of the barge and in the placement of equipment, a special effort has been made to provide flush decks and ample working space. The 17-ft. substructure provides headroom for the elaborate blowout-preventer hookup needed in a high-pressure drilling area such as coastal Louisiana. A rough-finish asphalt-base composition floor was built in the pump room to provide a nonskid surface and good drainage. Also, this type floor protects the steel deck from salt-water corrosion. To eliminate the use of A-frames or chain hoists (the latter might weaken the roof) in working on the engines, a 5-ton trolley hoist is standard equipment in the engine room.

Four prime movers, each developing 485 hp. or a total of 1,940 hp., have been installed on the Rhodes. The supercharged six-cylinder engines meet the power requirements with less weight. Most drilling barges are equipped with only three



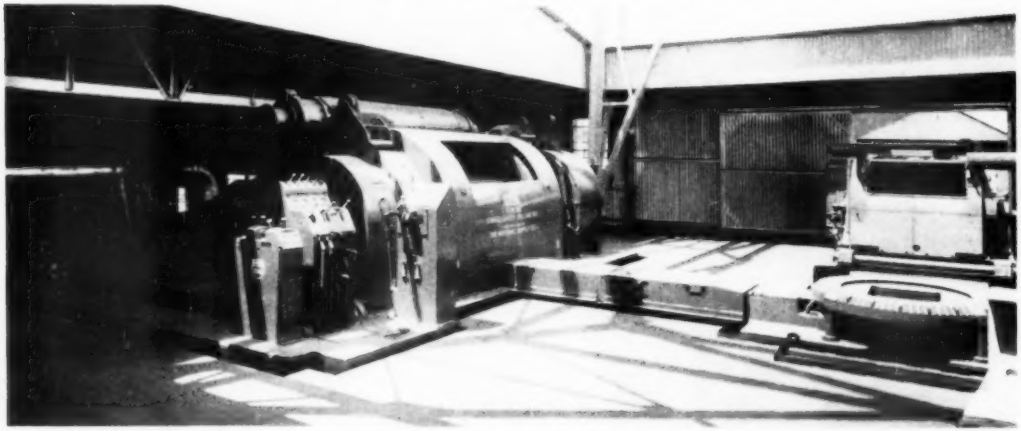
Texaco Built First Submersible Barge

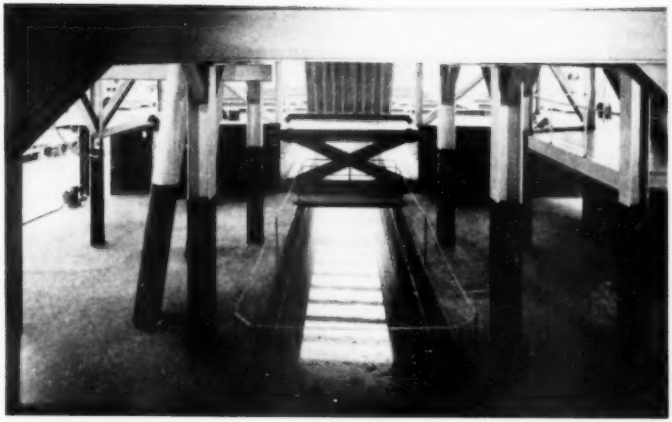
PRELIMINARY plans for the oil industry's first drilling barge were begun by The Texas Co. in the fall of 1931. The idea of a submersible barge had been conceived and patented by Louis Giliasso. Texaco made a contract with Giliasso for the licensing of all patent rights covering the construction of submersible drilling barges.

The first barge—the "McBride"—was placed in operation in September 1932 in Garden Island Bay field, Plaquemines Parish, Louisiana. This initial unit was built at Ingall Iron Works, Birmingham. The McBride was a twin-hull type of barge as contrasted with the single-hull slotted barge which is common today.

This new notion in drilling wells in water locations was attractive to operators for several reasons. Primarily, of course, the savings in cost of operation was appealing. It was estimated by an authority in 1946 that an approximate $15,000 savings per well is realized by the use of a submersible barge as compared with drilling from foundations constructed of piling or mats. When compared with a floating barge, the submersible barge offered several operating advantages; primarily its increased stability which left it relatively unaffected by tides, winds, waves, and changes in loading conditions.

This shot of drilling floor, taken before rig went on location, gives a good view of driller's position on this 20,000-ft. rig. The shaft-driven rotary table has a double universal in the drive to allow for some misalignment in case the barge moves while hole is being made





The drilling slot on Texaco's new mammoth barge is 10 by 85 ft. The pipe rack overlying the slot can be seen in the background

engines. The extra one on the Texaco barge provides an added margin of safety in case of engine breakdown. The engines are compounded by means of fluid couplings. A chain drive is used from the draw works to the compound. Heat exchangers are used on the engines in place of the more conventional radiators. The draw works is equipped with an automatic drilling feedoff control.

A conveyor belt is used to load mud into the dry-mud storage room. The two active mud pits have a capacity of 270 bbl. each while the two reserve pits hold 660 bbl. each.

A complete telephone communication system has been installed on the Rhodes. Phones have been placed at the driller's position, in the tool pusher's office, pump room, mud room, and the galley. In addition, a speaking tube is being used to communicate with the monkey board from the drilling floor; it also extends from the crown block to the drilling floor. A sound-deadening booth houses the telephones where necessary.

Following is a list of major items of equipment on the barge Rhodes:

1—Draw works—rated at 2,000 hp. input

2—Slush pumps—8½ by 16-in., 825-hp. input

4—Six-cylinder supercharged diesels—rated at 533 hp. at 900 r.p.m. intermittent

1—20½-in. shaft-driven rotary

1—300-ton hook

1—250-ton swivel

1—600-ton crown block

1—500-ton traveling block

1—189 by 37 ft. derrick—rated at 750 tons

1—7¼ by 12 mud-mixing pump—220 hp. input

2—Shale shakers

2—5½ by 6 washdown pumps

1—2,000-lb. air hoist

2—60-kw. generator units

1—1½-in. wire line.

Two electric-motor-driven shale shakers are used. The mud ditch and several of the mud control valves can be seen in the foreground

Drilling Problems at Lost Hills

(Continued from page 63)

even though they are at their worst in spring and fall, forced suspension of work a number of times. During one storm three men were lost overnight when sand covered the road back to camp and they drove off into the fields. At times as much as 2 ft. of sand drifted onto the road. The sand drifts through engine hoods and piles on the motor blocks and even sifts between brake and brake drum.

With prevailing winds north northwest one of the first protective measures was the construction of a storm fence on the windward side. The fence is made of corrugated-steel sheets. It is 10 ft. high and runs in two sections for about 500 ft. This did not improve the situation very much and a water line was run along the top of the fence for the purpose of spraying a screen of water and wet down the sand and dust that carried over the fence.

This did not provide the solution either and the water spray was moved about 30 ft. in front of the fence. The pressure of the water was increased to allow the throwing of a spray screen 10 ft. high. Later the spray line was moved still farther from the corrugated fence and additional sprays installed. In its present position the spray line varies from 58 to 72 ft. in front of the fence. Later another fence was set up about 365 ft. in front of the water line. This barrier is the usual form of snow fence, built of wood laths, about 4 ft. high.

In spite of the fences and water spray it is still necessary for the crew to wear goggles and respirators when the wind blows. At first dust goggles were used but these did not give sufficient protection and full-face respirator masks were substituted.

At the well head a 5-ft. ventilating fan is installed to keep bugs away at night and to aid in combating the blown sand. A water drip is connected above the fan to add a water spray to the air blown over the crew.

Engines are housed in. The pumps

are roofed over with tarpaulins and a fog of water spray operates in the area. All motor intakes are equipped with oil-bath filters. Lube oil is sampled and tested at frequent intervals. Filters and oil are changed immediately after a dust storm or in any event after 200 hours of service.

A mechanic is on duty with each crew. His job is to keep engines and pumps in running order. By far the greater part of his work is the prevention of the clogging of radiator honey combs and air filters.

As a direct result of these precautions and the efforts of the mechanics there has been no evidence of damage to engines or motors. Crank pins have been checked several times and show normal wear.

The loose formation in the upper levels and the high-pressure salt water farther down have made necessary rather unusual arrangements regarding mud and mud handling. So far, fresh-water mud has been used, weighted to 110-114 lb. with salt content held within 150-200 grams per gallon. Circulating pressures are held sufficiently high to have the mud continually pushing away from the hole. An extra pump with torque converter is held in standby condition to deliver mud at higher pressures should the need arise. The pump is equipped with 5-in. liners and controls that permit pumping at very low volume and high pressure. The need for this pump is evident from water found around 3,500 ft. at 1,800 psi.

There is a sixth man in the drilling crew whose specific job is the watching and control of mud and the fluid level in the mud pits. He keeps a log which carries a record of mud weight, viscosity, and salinity. At times weight and pit-level readings have been made as often as every 5 minutes. As closely as possible, level in the pits is held constant showing neither gain nor loss of material, after making proper operational displacement allowances.

Mud-rehabilitation equipment is also installed at the drilling site along with extra mud-storage tanks. This adds to mud economy and assists in mud control.

Much prior planning was laid down for this well and drilling has progressed carefully. While many problems were encountered, most had been anticipated and prepared for.

The first hole drilled was $12\frac{1}{4}$ in. This was reamed to $17\frac{1}{2}$ in. and again to 26 in. At this point 20-in. casing was run to 1,690 ft. The $17\frac{1}{2}$-in. hole was continued and a $13\frac{3}{8}$-in. protective string was run to 4,283 ft. Considerable water flow was found in this area but water shutoff tests were satisfactory following squeezing operations.

Beyond present depth plans call for $9\frac{5}{8}$-in. casing to about 7,200 ft. and $6\frac{5}{8}$-in. to bottom unless the hole goes appreciably past 11,000 ft.

With the 20-in. casing one of the largest blowout preventers ever used in California was installed. The entire setup weighed more than 40,000 lb. Dual controls were provided. One set was at the well floor near the driller and the other at the end of the walk.

The assembly itself consisted of a rotating packoff and three ram-type packoffs. Each flow line was guarded by a Cameron shutoff operated from a Hardy pump. The driving force for the packoff was an air-operated McFarland pump tested to 3,000 psi. but which can deliver the water to the packoffs at greater pressures if necessary.

With the installation of the $13\frac{3}{8}$-in. casing a correspondingly smaller blowout preventer was set in place.

Even though the 33-11 Williamson well is far from completed, in fact only a little better than halfway to the possible objective, the results so far stand as an achievement for both men and equipment. Certainly, without the combined knowledge and skills of engineers, drilling crews, and equipment manufacturers the well might not have passed its first and toughest 5,000 ft. and still be in condition to carry on toward the expected producing zone.

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Influence of OIL in Subsurface Corrosion of Oil-Well Equipment

by Walter F. Rogers

A study has been made of the effect of the produced oil on subsurface corrosion of oil-well equipment, and the ability of oils to wet steel in the presence of the produced water. It is found that oils vary widely in their tendency to wet and protect steel. The tests included the effect of varying the wetting ability of an oil on its protective effect at different oil-water ratios, the presence of an initial oil or water film, etc. A method was developed for surveying tubing to determine the presence of oil films in place for the purpose of correlating the oil drop-size ratio, surface oil films, and corrosion history. Wetting agents are now being used commercially to develop surface oil films on steel and reduce corrosion rates. This is resulting in a decrease in corrosion costs for the wells treated and offers the possibility of a practical widespread method for treating both sulfide and nonsulfide wells. The author is with Gulf Oil Corp., Houston. This paper is from the technical program of the 1949 production engineering conference, Gulf Oil Corp., Pittsburgh.

A SERIOUS study of corrosion made in 1940, found that equipment in oil wells on the Texas and Louisiana Gulf Coast producing as little as 10 per cent sweet oil was almost unaffected by corrosion. An extension of this work to sour oil wells, and particularly to those in western Kansas, indicated that oil contents above 25 per cent to 50 per cent were required to give protection. Inasmuch as studies of the aqueous phase of well fluids had failed to be sufficiently informative, it was decided to investigate the influence of wetting power of crude oils and the water-oil ratio in corrosion rates. It is the purpose of this paper to discuss the results which have been attained.

Technique for Measuring Wetting Power

The sessile drop method was chosen to study the ability of crude oils to wet steel in the presence of their associated waters. The apparatus in which the oil-drop performance is measured consists of a clear-glass chamber with glass internal shoulders 1/16-in. wide extending the width of the cell and to a height of 1 in. above the bottom. This cell is held in place in a clear-glass water bath by means of a metal basket suspended from the top of the bath. A pump circulates clear water around the test cell to keep the fluid at room temperature. A fluorescent lamp mounted behind the cell furnishes light for viewing the sessile drop with a 15-power measuring microscope.

The metal specimen is lowered into the liquid phase and allowed to rest on the glass shoulders of the cell in a horizontal position. Drops of the oils are placed on the lower side of the metal by special pipettes. The diameter of the pipette at the fine end should be about 0.50 mm. The length of the bend should be such that it can be put under the steel specimen. The full-diameter portion of the pipette is about 4 in. in length.

To load the pipette the small end is immersed in the liquid to be tested, some liquid pulled into it by suction, and the outside end wiped clean. The pipette end is then placed in the fluid under the steel and tiny drops blown. These must not be over 0.10 cm. in diameter and preferably not over 0.05 cm. Each drop when blown is shaken from the pipette by gentle tapping, causing the droplets to rise to the steel face. Usually four such drops are placed in position. After the drops are placed their size is measured immediately and then after 3 hours standing. It has been found that equilibrium is essentially reached by this time.

The method of steel preparation has been found to be of extreme importance in obtaining duplicable results, a standard procedure having been developed. The steel specimen is of 1020 material. It is ground and polished with various sized emery cloths until flat, followed by a polish with clean dry crocus cloth to give a smooth surface. This surface is rinsed in carbon tetrachloride to remove oil or grease. The specimen is then boiled for 10 minutes in a 20 per cent sodium hydroxide solution containing pellets of metallic zinc. It is then rinsed thoroughly with distilled water, dipped in a 10 per cent

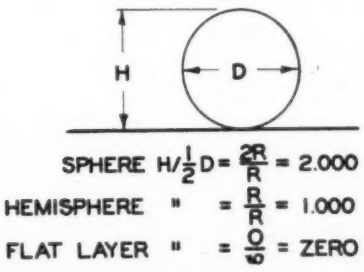

Fig. 1—Drop-size ratio measurements

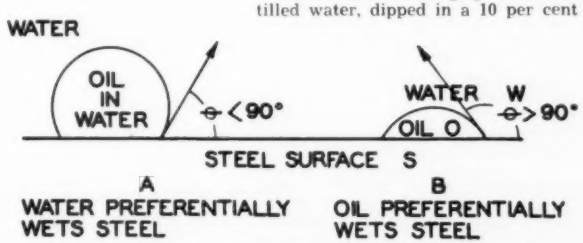

Fig. 2—Typical drop shapes for wetting and nonwetting conditions

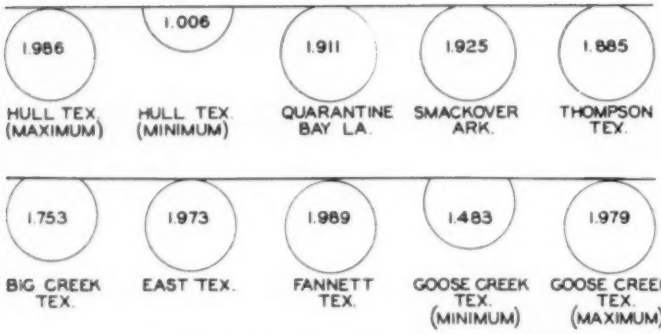

Fig. 3—Drop-size ratios of nonsulfide oils in their produced waters

sulfuric acid solution, and again well rinsed with distilled water.

The method of reading the drop measurement and calculating the result is shown by Fig. 1. The measurements made are the height and the diameter of the drop. The measurement of the drop-size is $h/\frac{1}{2}d$. In this case the drop material does not wet the steel, the height being equal to twice the radius. This ratio is 2. If the oil wets to the extent of forming a hemisphere the relation becomes 1. The ratio approaches zero as the drop approaches a flat layer.

Fig. 2 shows phase relations which may exist between the oil, water, and steel, and which illustrates the commonly accepted conditions (1) the water phase preferentially wets the metal and (2) the oil phase preferentially wets the metal. In this figure,

S = the steel surface
O = the oil
W = the water
Y = the interfacial tension symbol

At equilibrium the interfacial tensions have the following relation:

$$Y_{ow} = Y_{ws} + Y_{os} \cos \theta$$

Measurement of Drop-Size Ratios

Samples of water and oil were obtained from a large number of sweet and sour oil wells in Mid-Continent producing areas and the wetting ability of the oils measured in the presence of the produced water. Fig. 3 shows graphically the shapes of oil drops against water-wet steel for 10 sweet-oil wells in 8 different fields. Two fields are mentioned twice to show the wide range of wetting ability of the produced oils.

The high drop-size ratio wells at Goose Creek, Smackover, and Hull have suffered from corrosion. The wells at Hull and Big Creek which show some wetting characteristics have suffered very little corrosion.

A similar set of data was obtained on the behavior of sour oils in their waters. In this case the oils were tested against iron sulfide surfaces. None of the oils had any ability to displace water from an iron sulfide surface. This undoubtedly explains to some degree the greater corrosiveness of sulfide waters. Once the steel surface becomes water wet the produced oil is unable to displace the water and protect the metal.

A few sweet oils possess a marked tendency to displace water from steel; and wells producing such oils should have a low corrosion rate. In general this checks with field experience. Many other sweet oils have little or no ability to displace water according to the drop test and must, therefore, be largely nonprotective. Many corrosive wells are found to produce this type of oil. All of the sulfide oils tested were found to be nonwetting and therefore, nonprotective in nature. This is believed to be one of the major causes for high corrosion rates under sulfide conditions.

Effect of Oil Percentage and Wetting Ability on Corrosion Rate

The apparatus used for the laboratory corrosion test consists of a machine that vigorously shakes a bottle containing a prepared weighed steel specimen together with the water and oil being studied. The specimens used consist of 1 by 4-in. 20-gage plates with corners turned down ¼ in. to act as legs. The weight of a specimen is between 15 and 20 g. After a test the specimens are thoroughly cleaned, dried, and weighed, and the weight loss determined. The specimens are then pickled in 10 per cent sulfuric acid for a few hours, rinsed, and dried. They are then weighed and kept in a desiccator until used again. A shaking time of 72 hours is used.

The first test was designed to determine the per cent protection offered by varying percentages of oils of different kinds. In each case the water used was that produced with the oil. The data are shown in Fig. 4. Four of the oils tested, i.e. Goldsmith, Kansas, East Texas, and Smackover, have low wetting powers as shown by their drop-size ratios which are over 1.900. It will be noted that at low oil percentages they offer low protection but increase in protective ability as the percentage of oil increases. This illustrates what might be determined the mass effect, which enables the metal surface to be bathed by increasing quantities of oil resulting in contact with the metal of decreasing quantities of corrodent.

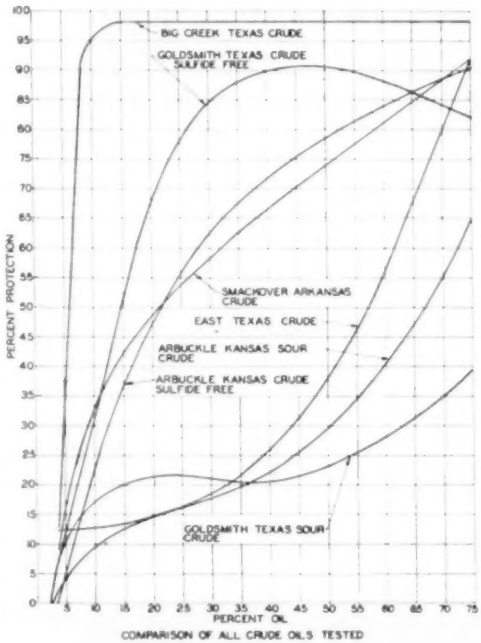

Fig. 4—Comparison of all crude oils tested

It was of further interest that removing the sulfide from the two sour oils by blowing with gas had a major effect on their protective ability. When tested in the sulfide-free condition the two oils give vastly greater protection although the per cent protection still increased with the oil content.

A second set of tests were made on a single sweet oil and water to determine the effect of the exact drop-size ratio of the oil and whether a difference in protective effect exists depending upon whether the metal surface is wetted with oil or water at the start of test.

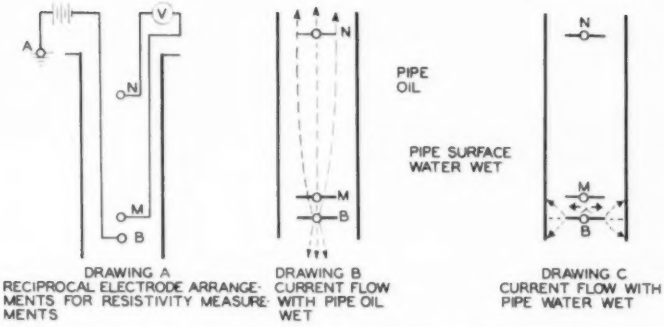

Fig. 5—Four-electrode method for measuring oil films on tubing

The tests were made with oil from Big Creek field. To reduce the drop-size ratio of the oil, i.e., increase its wetting ability, wetting agents were added. The tests were conducted at three water-oil ratios of 15 per cent oil-85 per cent water; 35 per cent oil-65 per cent water; 75 per cent oil-25 per cent water. One-half of the specimens tested were prewater-wet in the Big Creek water just before placing them in the test jars. The other half were wetted with the test oil just prior to starting the tests.

Data from these tests show that where well equipment is to be protected by wetting agents enough agent must be used at the start of the test to force the entire metal surface to become oil wetted. This will probably require the use of enough agent to maintain a drop-size ratio of 1.0 or less for several hours. After this is done the performance of the equipment should correspond to that of an oil-wet specimen, which means the protective oil film can be kept in good repair with sufficient treatment to maintain a drop-size ratio of about 1.800. The greater the per cent water the lower the drop-size ratio will have to be for good protection.

Oil-Film Presence on Production Tubing

It was necessary to develop a survey tool to determine if tubing were water or oil wet since there was none available at the start of the work. A large well-service organization adapted its regular electric logging equipment to give a measure of the tubing surface resistance, which is, in effect, an index of the presence or absence of oil.

The basic survey tool and theory of operation is shown in Fig. 5. A three-electrode assembly is lowered into the hole on a multiconductor cable. The electrode lengths are 1 in. each. The distance from the first to the second electrode, measuring down from the top is 36 in., and from the second to the third 4 in. A fourth electrode is connected at the earth surface to ground. A fixed current is made to flow from the ground to the bottom electrode. The tubing or casing in which the survey is made is filled with the salt water produced by the well. The run is made by withdrawing the electrode assembly at a fixed rate and recording the potential drop between the two upper electrodes as the tool is raised.

Let it be supposed that the tubing is water wet, as shown in Fig 5-C. In this case the current will flow from electrode B to a point on the tubing opposite the electrode from which point it follows the tubing to the ground connection. This results from the fact that this represents the lowest electrical resistance path. In this case no current passes electrodes M N and no potential drop is recorded.

As an opposite case let it be supposed that the tubing is completely coated with a high resistance oil film except for a point in the upper portion of the tubing. This case is represented by example B, Fig. 5. Now the lowest resistance path is from electrode B up the salt water column past electrodes M N to the bare spot on the pipe and from there to the ground connection.

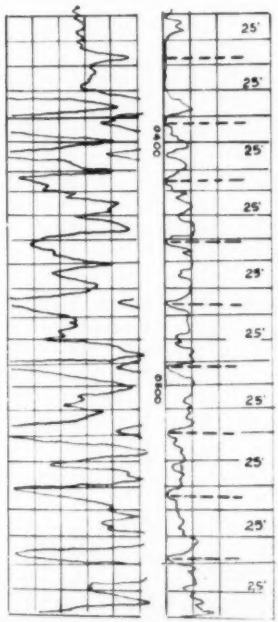

Fig. 6—Goose Creek, Texas, nonsulfide water. 1 res. div. = 14 ohm — m

The potential drop is then taken as an index of the presence of oil. The value is usually calculated in ohm-meters and normally in an open hole, would correspond to the average resistivity of the earth in the spherical annular space, using the distance B M and B N as radii. It is found in practice that the resistivity obtained with water-wet pipe in oil-well brines is so low that essentially zero resistance is recorded. If oil is present opposite electrode B a resistance value is recorded. Unfortunately, it is not yet possible to interpret the resistance values in terms of per cent of pipe surface coated with oil.

In making such a survey care must be taken that the electrolyte in the tubing be uniform as the presence of free oil or oil-emulsion slugs in the water column may result in appreciable changes in resistance and erroneous interpretations.

Field Studies of Oil Films on Tubing

Field surveys were made of the tubing in a number of wells to check whether the metal surface was water or oil wet as indicated by laboratory drop-size ratios of the produced oils and to correlate the results obtained with the actual well corrosion rate.

Fig. 6 shows the results of a survey made on a lease in a Texas Gulf Coast field. The interval 350 to 590 ft. is shown. This well produces 92.5 per cent water and the oil, with a drop-size ratio of 1.488, possesses considerable wetting ability. The survey shows the tubing to have an appreciable surface resistance except over 4-ft. spaces at 25-ft. intervals. The high surface resistance would be expected from the low drop-size ratio of the oil. The areas of no resistance are 25 ft. apart from the top to the bottom of the well. This corresponds to the coupling spacing on the sucker rods and apparently results from coupling wear removing the protective oil film.

This well demonstrates two points. First, oils of low drop-size ratio develop high-resistance surface films on tubing. Second, if rod wear removes the oil film, as evidently occurred at the coupling section, and the well produces corrosion fluid, then corrosion will occur. This well also demonstrated in common with Smackover production that some oil-well brines are corrosive in character just as the East Texas and Darst Creek wells demonstrated that some well fluids are noncorrosive.

The cure for the corrosion which

(Continued on page 79)

Improved CASING CEMENTING

. . . achieved by adoption of materials and practices readily available today

by William D. Owsley*

ADEQUATE planning, proper equipment, correct performance, and sometimes the expenditure of a few extra dollars on a casing job can save many times over the cost involved by elimination of various troubles at a later stage of well life. The kinds of formation drilled through, differences in well temperatures, widely separated zones of production, and differences in drilling practices all cause some variation in cementing procedures and cement-job requirements.

The work of Howard and Clark[1] clearly shows the fact that any practically obtainable velocity of flow of cement slurry does not remove mud filter cake from the wall of the hole. This is true, not only of the thin and tough true filter cake, but also applies to deposits of mud which have become thickly gelled by lying dormant in the hole. While high flow velocity is helpful, in most cases some additional means must be used to remove mud cake in order to secure complete bonding at the critical points of protection needed in the well.

Today in most areas mechanical means for well-bore mud removal are accepted practice. Both the rotation and the reciprocation types of wall-cleaning devices are in common use, together with casing centralizers. Both general types of these cleaning devices assist in securing successful cementing jobs. Both have their respective merits, advantages, and disadvantages.

Practically all oil areas of the United States conclusively show the value of wall-cleaning devices. Cannon,[2] in an A.P.I. paper, reported the reduction of squeeze cementing jobs from 0.58 jobs per casing string to 0.16 jobs per string by proper use of mechanical wall-leaning devices in Gulf Coast and Southwest Texas areas.

In West Texas and in the Kansas gas fields it has been possible effectively to isolate closely spaced zones so that they could be individually acidized and better produced by placing cleaning and centralizer devices between them. The present trend for use of cleaning devices is to place them at stategic points rather than indiscriminately over long sections of the hole. Study of electric logs, cores, and caliper logs should be made before deciding on a mechanical cleaner program for any area.

Certain simple precautions with jobs utilizing cleaners can add greatly to possibility of success. Where rotating cleaners are used, it has been found desirable in many cases to begin rotation at a slow rate, about 5 to 10 r.p.m., and to apply the circulating pump immediately after rather than before the start of rotation. Fig. 1 illustrates results of using wall cleaners.

A method of continuous circulation with rotation at alternate speeds —about 20-30 r.p.m. for several minutes, then decreased to a low level of 5 to 10 for a minute or two—has proven advantageous. Repeating this cycle during desired circulation time before cementing and during the cementing job until cement has traveled about the uppermost set of cleaners allows cut-away mud cake to travel up the annulus in short sections. This results in lower pump pressures than might otherwise be obtained.

Use of the complex phosphates for water-base-mud treatment within the hole in connection with cleaning devices is increasing and appears to give good results. In this procedure a 5 per cent solution of the phosphate

*Technical adviser, Halliburton Oil Well Cementing Co., Duncan, Okla. Portion of paper presented at fall meeting of Petroleum Branch, A.I.M.E., Los Angeles.

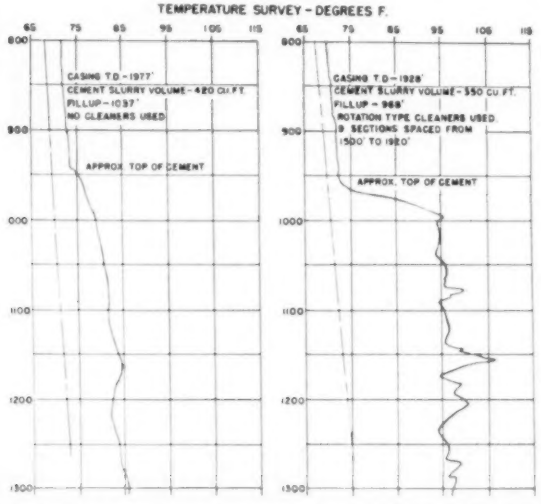

Fig. 1—Temperature surveys consistently show lower fillups where scratchers have been used. Note the sharpness of the cement-top break in the temperature survey graph at right

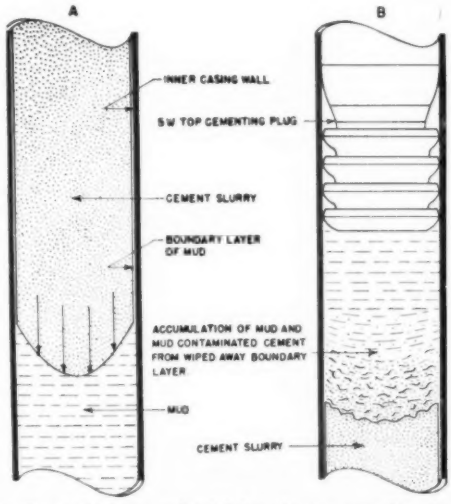

Fig. 2—Mud accumulated below the top cementing plug is found after the cement job around the casing shoe. A bottom plug will remove this mud from the casing wall

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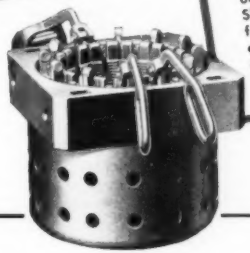
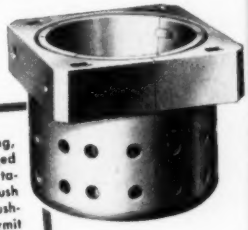
Did you know that you can run casing jobs with the same ease, convenience and simplicity with which you run your drill pipe? All that you need is a Baash-Ross Split Rotary Table Casing Bushing which replaces the regular master bushings in the rotary table and permits casing to be run *through the table* with the crew working at the same convenient height and in the same efficient manner as when handling drill pipe. Here's all you do...

1 Simply lift out the regular master bushings, drop in the Split Casing Bushing and lock the table. The Split Casing Bushing is thus solidly supported and properly centered over the hole so that you can run casing with the same ease and with the crew working at the same convenient height as when running drill pipe.

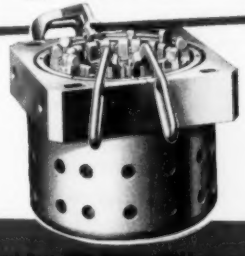
2 For large diameter casing, the larger sizes of Baash-Ross Type "UC" Casing Slips can be seated directly in the bore of the Split Bushing. As outlined below, "UC" Casing Slips insure a uniform full-circumferential grip on the casing that eliminates risk of damaging the thin casing walls through concentration of slip pressure.





3 For smaller sizes of casing, drop in a split and hinged Slip Adapter which is tapered on both sides and sets flush with the top of the Casing Bushing. Removable handles permit quick and convenient insertion of the split and hinged Slip Adapter.

4 With the Slip Adapter in place, Baash-Ross Type "UC" Casing Slips to fit smaller sizes of casing can be set directly into the tapered bore of the Slip Adapter, thus permitting a wide range of casing jobs to be run with equal efficiency.

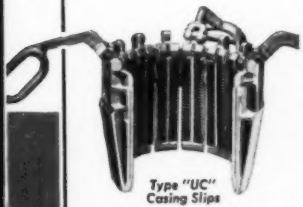


Handles Wide Range of Casing Sizes

Rotary Bore	Maximum Casing Size
27½" Dia.	21½" API
24½" Dia.	18⅝" API
20½" Dia.	16" API
17½" Dia.	13⅜" API

Modern rotary tables are able to support even the longest and heaviest casing strings with ample safety, and the Split Rotary Table Casing Bushing is ruggedly built to withstand the same service. Yet it is light in weight and readily portable in small tool cars.

The maximum casing size handled by the Casing Bushing is determined by the diameter of the opening through the rotary table. The accompanying chart shows the largest casing size that will pass through the Casing Bushings made for various size rotaries.



Type "UC" Casing Slips

Type "UC" Casing Slips Insure Maximum Safety in Modern Casing Operations

Baash-Ross "UC" Casing Slips are the most modern advancement in slips for handling casing strings. Because they consist of many narrow slip segments flexibly linked together, they *w-r-a-p* around the casing for a uniform, full-circumferential grip, thus insuring greater safety and maximum gripping efficiency on the relatively thin walls of casing strings. Their easily-renewable liners provide long life and low maintenance, and they have many other unique features. For more details see page 276 of the 1947 Composite Catalog.

Baash-Ross split Casing Bushings are available domestically through leading supply stores.

For export orders write direct to Baash-Ross Tool Co., 11 W. 42nd Street, New York, N. Y.

in fresh water is mixed in the cementing truck tank to make from 10 to 30 bbl. of solution. This is introduced into the casing just ahead of the cement slurry and bottom plug. Coupled with the mechanical action of the pipe movement, the phosphate solution acts to further disperse and clear mud cake from the bore wall and casing and will also reduce water loss into the formation.

Use of the Bottom Plug

During the war years when casing was not plentiful many companies shortened the footage of pipe set below the base of a producing zone where perforations were to be used for production. The shoe joint was often perforated after drilling out the float collar. In many cases either soft cement or none at all was found under the float and sometimes mud was produced after perforating. Then a squeeze job was required to correct the situation. It is now known that the bottom plug, much more than the top plug, is necessary to prevent collection of this mud. (See Fig. 2).

Greater emphasis than ever before is being placed on the use of bottom plugs. It is evident that their use can eliminate at least one cause for casing cementing failure and at least part of the difficulty in not being able to reach the float after cementing.

Bentonite-Cement Mixtures

Some of the advantages to be gained by the use of bentonite in cement slurries are:

1. Secures a reduction in the cost of cement. The addition of from 2 to 4 per cent gel produces a set volume increase of up to approximately 21 per cent, whereas the unit cost increase by reason of the addition of the bentonite is only 11.7 per cent at present prices.

2. Settling out of cement particles or vertical separation of excess mixing water is decreased to a minimum if not entirely eliminated. This removes the principal cause for the formation of water pockets in set cement behind casing, which may lead to bad cementing jobs by permitting interconnection between zones desired to be isolated.

3. The weight of the cement column is decreased which is beneficial in many areas where formations will not sustain a high bottom hole load.

4. Set "gel cement" slurries are somewhat better adapted to gun perforating with a minimum of cracking and shattering than cement slurry which does not contain bentonite.

5. Under most conditions gel cement has a longer pumpability time than does ordinary cement.

Lost-Circulation Materials

With amounts of lost-circulation material larger than ¼ lb. per sack, it is advisable to use a safety device in the casing string above the topmost float. With this device, if the material should resist pumping by bridging in the passages of the floating equipment, a safety plug will be blown out to allow the rest of the cement slurry in the casing to be satisfactorily landed. A device of this kind is available and is usually built to blow out at a differential pressure of approximately 1,500 psi. Its greatest usefulness is in Kansas where large amounts of cellophane are often added to cement slurries.

Any material for the prevention of lost circulation or dehydration of cement during the casing cementing job should be carefully studied for its effect on the cement to which it is added. Many organic materials have at least a slightly detrimental effect on the setting of cement, and some organic fibers cannot be used in cement slurry as they may completely prevent setting.

Stage Cementing

There are numerous advantages to be had by the use of multiple stage-cementing devices on casing jobs. Some of these are:

1. The ability to secure very long fillup columns behind the string of casing without the danger of cement setting or dehydrating in place before the total required amount is landed.

2. The possibility, as is practiced in areas where lower formations frequently break down under cementing loads, of cementing the lower end of the casing string, then continuing to circulate through the multiple stage device ports until the lower stage of the cement has set sufficiently to hold the balance of the cement column. Then placing the device to the higher levels required.

3. The ability to isolate shallower zones both from the surface and from lower zones without having to run a continuous column of cement across great distances in the hole. Frequently, this can result in the elimination of one or more strings of casing.

Of growing importance in some areas is the use of formation packer shoes. This kind of device is arranged so that the packer carried about the outside diameter of it can be expanded to fit tightly within the well bore and a side port opened to allow the cement slurry to pass out above the packer. This type of float and guide shoe is especially important in areas where it is desired to completely explore the formation below the casing point and where it is not practical or not desirable to complete the well for production by setting casing through the zone and perforating for production.

Formation packer shoes now may be set within broader limits of hole and casing size and will withstand much larger differential pressure than when first introduced. An advantage of this type of shoe is that the expansion of the packer tends perfectly to centralize the casing at the shoe position in the hole.

Operating companies in Illinois found during the war that they could produce as many as three or four zones successively through one string of casing by the use of aluminum-alloy joints placed opposite the producing formations. Casing was set to the lowermost zone to be produced.

This zone was usually a lime which exhausted itself quite rapidly after acid treatments. After exhaustion it was plugged off and the aluminum section of pipe opposite the next higher producing zone was then removed to permit production at that interval. Removal of these aluminum casing windows has been accomplished by means of expansion reamers, shooting with nitroglycerine, and with a caustic-nitrate solution process. The chemical removal method is particularly effective in that the heat generated during the reaction with the aluminum alloy usually breaks up the cement surrounding the aluminum window and causes it to crack away from the formation.

References

1. George C. Howard and J. B. Clark, Factors to Be Considered in Obtaining Proper Cementing of Casing, A.P.I., November 9, 1948.

2. George E. Cannon, Improvements in Cementing Practices and Need for Uniform Cementing Regulations, A.P.I., November 9, 1948.

Pressure-Surge Tests On Oil Pipe Lines

(Continued from page 66)

Column separation.—When the total pressure at any point along a line falls below the "bubble point" pressure of the flowing liquid, gas may be formed. If this condition persists for a sufficient period, the liquid column may part—being separated by a section of gas or vapor. Separation may occur at high points which are near the normal hydraulic gradient during a "negative" surge wave on a line with a fairly long 2 L/a period.

Column separation is considered dangerous because of the high pressures which may be created when the two liquid columns rejoin. If, for example, the two faces of a separated column rejoin with a combined change in velocity of 10 ft. per second, the resulting surge pressure might be 450 to 500 psi.

Little seems to be known about column separation, or about the rate of reabsorption of vapors when two columns try to rejoin.

During the McCamey tests, pressure surges exceeding 200 psi. were created by rejoining a stream which had been purposely separated. The velocities of the rejoining faces were not measured.

Attenuation of surges.—Surges are

observed to disappear, dissipate, or attenuate as a result of:

1. Friction.

2. "Capacity effect" of the oil and pipe.

3. Reflected waves of rarefaction.

The surge which creates a slow oscillation of the liquid column is reduced by friction which resists the oscillating flow. This "friction attenuation," which is proportional to the square of the velocity, affects only the flow component caused by the surge and is, therefore, effective only after the first reversal of flow.

The "capacity effect" is most apparent in the case of a sharp front wave such as that produced by instantaneous valve closure. This effect decreases the pressure at the "wave front" as the wave travels along the line. . . . This change of wave shape is due to the capacity effect of both the pipe and oil behind the traveling pressure wave. An additional quantity of oil flows into the higher-pressure section due to the stretch of the pipe and to the compressibility of the flowing oil. This is more easily shown with an instantaneous closure.

As the pressure wave proceeds along the pipe line, the result of this capacity effect prevents an instantaneous change in stream velocity at the wave face. The stream velocity does not suddenly fall to zero, but there is a small residual flow behind the wave face which depends on the "capacity" of the pipe and oil in the section behind the face.

The attenuating effect of a reflected wave is shown in Figs. 7b, 7c, and 7d. The reflected wave cannot be measured directly, but a gage at any point along the line will measure the sum of the incident and reflected waves.

Bulk modulus.—The bulk modulus of a liquid is the reciprocal of compressibility which may be defined as the per-unit volume change per pound per square inch. A direct method was employed to measure the bulk modulus. The oils used in the field tests were subjected to a known pressure, and the change in volume was measured. The oil sample was found to compress slowly:

$$\text{Compressibility} = \frac{V_1 - V_2}{V_1 (P_2 - P_1)}$$

$$\text{Bulk modulus} = \frac{(P_2 - P_1) V_1}{V_1 - V_2}$$

under constant pressure—the rate of compression depending on the amount of agitation. The bulk moduli used for these tests were determined at 1 min., which was the approximate 2 L a of the long test lines. The bulk moduli measured when compression ceased was found to be 10 to 15 per cent lower than the value determined at 1 minute.

Bulk moduli of the test oils and products were:

	Temp. (° F.)	K (psi.)
West Texas crude A.P.I. gravity, 39.0 at 60° F.	45	*223,000
	70	198,000
	100	179,000
McCamey crude A.P.I. gravity, 26.9 at 60° F.	37	*280,000
	70	254,000
	100	227,000
Plantation Pipe Line Co. gasoline (sp. gr., 0.733 at 72° F.)	72	*146,000

*The bulk moduli of the foregoing oils, determined from the speed of wave propagation, were 216,000, 218,000, and 148,000 psi., respectively. The large discrepancy between measured and observed bulk modulus of the McCamey crude was attributed to entrained vapor or gas in the liquid column during the field tests.

Other tests by an independent laboratory indicate that bulk modulus may vary with pressure.

Subsurface Corrosion

(Continued from page 75)

occurs to the coupling ends in this well is to use a wetting agent which will force the oil to wet the rod and tubing areas where severe wear occurs.

Development of Oil Films by Wetting Agents

The basic points to be remembered in treating a well are: (1) the greater the percentage water the greater the wetting ability of the oil must be to give protection, and (2) the metal surface must be completely coated at the start of the test with the oil film. After the protective coating is laid in place daily treatment can be reduced because of the greater ease of keeping a deposited oil film in repair than in laying one down in the first place.

When a well is to be put under treatment with a wetting agent it is advisable to measure the drop-size ratio of the oil with different quantities of wetting agent. From these tests both the most effective material and the amounts required can be determined. At the start of the treating of a pumping well it is advisable to use sufficient wetting agent to develop a drop-size ratio of 1.00 or less.

It has been found in practice that an economical method of accomplishing this is to close the flow line from the well to the stock tank and connect the well outlet to the annular space, thus circulating the well fluid down the casing and back up the tubing.

The wetting agent, usually 5 gal., is lubricated into the circulating stream during the time required for one circulation.

After this addition the well flow is circulated for the desired time, i.e., 5 to 6 hours. After this preliminary treatment to deposit the initial oil film, the flow is diverted to the stock tank. Once each day thereafter, the wetting agent, dissolved in 10 to 20 gal. of oil, is lubricated down the annular space, or better, the treatment is poured into the annular space and the well production diverted to the annular space for 30 minutes to flush the treatment to bottom.

Conclusions

It is concluded that:

1. Oils of high-drop size ratios do not tend to wet steel in the presence of water, but permit the metal surface to be covered with a nonprotective water film.

2. As the drop-size ratio of an oil is decreased the protective effect of the oil is increased and by using the proper amount of wetting agent this can be carried to the extent of covering the metal equipment with a protective oil film.

3. Certain oil well brines of both the sulfide bearing and sweet types are noncorrosive in character. The handling of such water can be done in steel equipment with a low corrosion rate regardless of whether the metal surface is oil or water-wet.

4. Certain oil well brines of both the sulfide bearing and sweet types are corrosive in character. The handling of such waters in steel without a protective film results in rapid corrosion attack. If the natural drop-size ratio of the oil is sufficiently low to deposit an oil film the equipment will be protected. If not, corrosion will occur.

5. The fact that some oil well brines are corrosive, whereas others are not, forces a reexamination of oil-well brines to determine the corrosive constituents.

Literature Cited

1. Rogers, W. F., Shellshear, W. A., "Corrosion of Steel by Oil-Well Waste Waters," Industrial Engineering Chemistry, 29, 160, 1937.

2. Mack, G. A., Lee, D. A., "Determination of Contact Angles From Measurements of the Dimensions of Small Bubbles and Drops," Journal of Physical Chemistry, 40, 150, 1936.

TABLE 1—FIELD TREATMENT OF SOUR OIL WELLS WITH WETTING AGENTS
(Data as of March 30, 1949)

Well	Months treated	Daily treatment (gal.)	Oil/Day (bbl.)	Water/Day (bbl.)	Repair cost per month before	Repair cost per month after
J. T. McElroy 30	5.0	.50	16	240	$ 428	$ 0
J. T. McElroy 36	6.0	.25	21	159	501	41
J. T. McElroy 65*	6.9	.25-.50	13	450	465	484
J. T. McElroy 137	15.8	.50	10	12	77	20
J. T. McElroy 259	15.8	.50	13	0	94	41
Sate-Lasseter 1	3.1	.25	19	18	285	89
State-Lasseter 4	3.5	.25	9	25	300	23
W. T. Ford 1	4.3	1.0	40	20	1,247	464
A. Kloh "G" 1	9.7	.75	11	10	492	58
McKnight 1	15.0	1.0	12	12	63	46
University CC 1-T	12.5	.50	13.4	0.60	921	93
Totals					$4,873	$1,359

*In this case treatment was insufficient to lay down a protective oil film—shown both by a well survey and a high corrosion rate.

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gives faster penetration because

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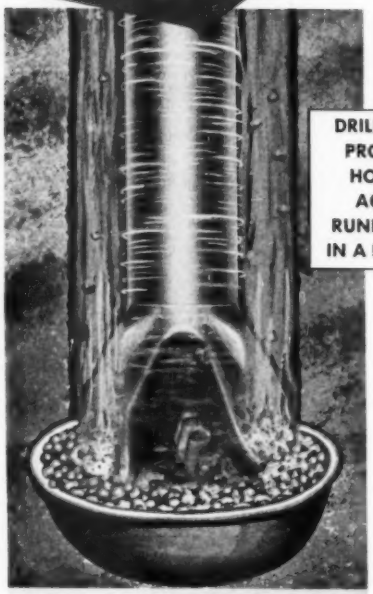
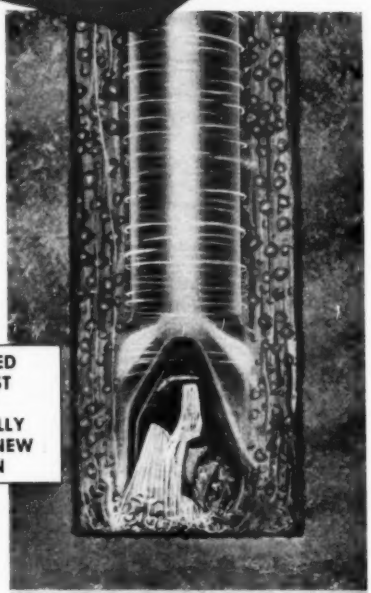
But...

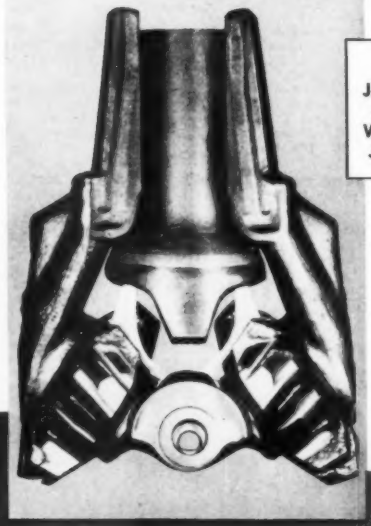
YOU DO WANT *this*



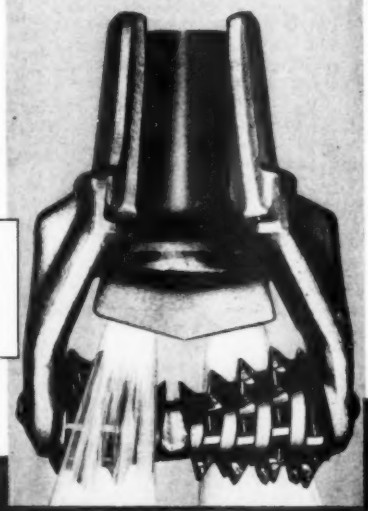
DRILLING WITHOUT PROPER BOTTOM HOLE CLEANING ACTION IS LIKE RUNNING YOUR BIT IN A PAN OF GRAVEL



THE NEW REED LIQUID-BLAST ROCK BIT IS CONTINUALLY CUTTING ON NEW FORMATION



VIEW SHOWING JETTING ACTION OF SIDE CUTTER JETS, WITH CROSS ROLLER JETS PLUGGED OFF



VIEW SHOWING JETTING ACTION OF CROSS ROLLER JETS, WITH SIDE CUTTER JETS PLUGGED OFF

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it cleans the bottom of the hole

For better cutter tooth cleaning action and more effective utilization of the drilling fluid energy... for faster penetration and more hole per bit

The new Reed Liquid-Blast ("LB") Rock Bits were designed to more effectively utilize the output of the surface pumping equipment.

The bit body has been designed to permit the use of a slush nozzle giving a more effective distribution of the drilling fluid and with nozzle openings designed to direct powerful jets between the cutter teeth and onto the bottom of the hole.

This powerful jetting action, however, is not entirely dissipated on the cutter teeth but continues on to the bottom to remove the bit cuttings rapidly from the bottom of the hole.

Reed "LB" Rock Bits, therefore, are continually cutting on new formation, and the possibility of re-cutting formations already loosened is practically eliminated.

Don't let your rock bit rotate in a "pan of gravel" but specify the bit that cleans the bottom of the hole—the new Reed "LB" Rock Bit.

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South Texas Operator Solves Problem Of Scarcity of High-Pressure Gas in

PRODUCING LEASES BY GAS LIFT

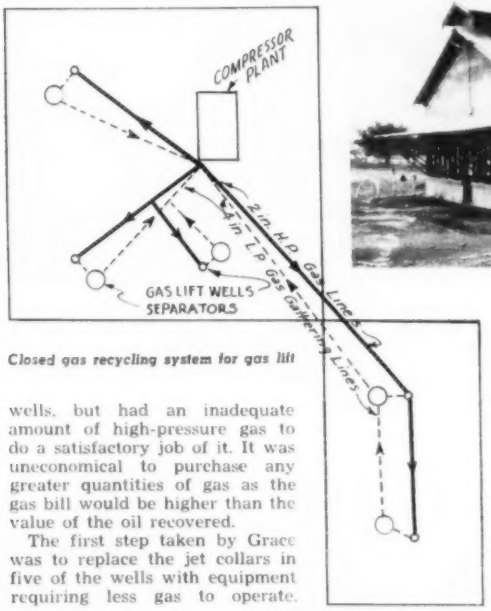
Grace Oil Co. operates three different types of lift equipment in two leases in Refugio field, near Corpus Christi

by Leigh S. McCaslin, Jr.
District Editor

THE ever-increasing problem of scarcity of high-pressure gas for gas-lift operations has been solved successfully by a South Texas operator. By means of modern gas-lift valves, a closed system, and portable compressor units, Grace Oil Co. of Houston is doing a good job of producing two of its leases in Refugio field, some 30 miles north of Corpus Christi.

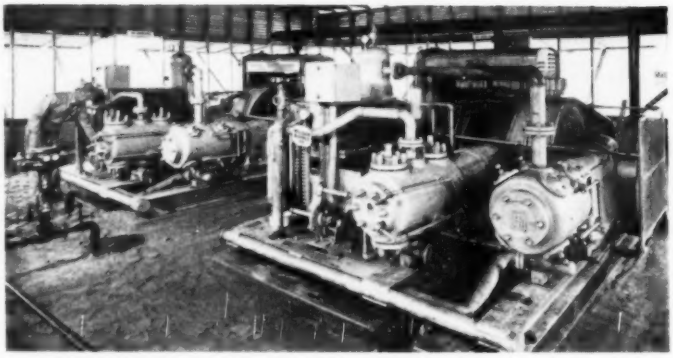
The advent of long-distance gas pipe lines from the Gulf Coast to the East and Midwest has made its increasingly difficult to purchase high-pressure gas. Not only has the price of gas increased considerably, but it has become unavailable in some localities. Contracts with the natural-gas pipe-line companies have tied up the major portion of the available gas produced in certain areas.

Several months ago Grace Oil Co. took over the operation of two small leases in Refugio field. The wells were producing large amounts of water and very little oil. The previous operator was using jet collars to produce the wells, but had an inadequate amount of high-pressure gas to do a satisfactory job of it. It was uneconomical to purchase any greater quantities of gas as the gas bill would be higher than the value of the oil recovered.

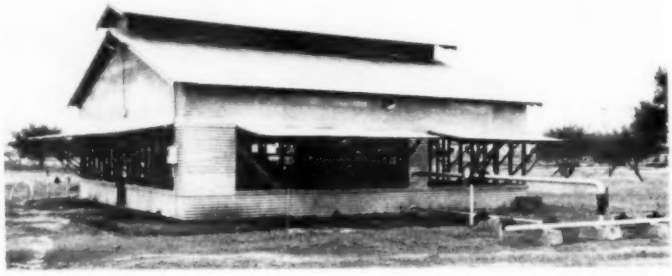


Closed gas recycling system for gas lift

The first step taken by Grace was to replace the jet collars in five of the wells with equipment requiring less gas to operate.



Input gas is boosted from 30 to 500 psi. by these two portable compressor units. They are completely unitized and require only the connection of suction and discharge lines to be placed in operation. Compressor and prime mover are skid mounted and completely assembled before delivery



This building houses a pair of two-stage 8 by 4¼ by 9-in., 75-hp. compressors which are the heart of Grace Oil Co.'s gas-lift system in Refugio field, Texas Gulf Coast. Grace has solved the problem of gas scarcity by installing a closed system to gas lift its two leases in this field

Three different types of gas-lift equipment were installed—the type being determined by the volume of fluid to be handled. The three types were: (1) tubing flow valves, (2) casing flow valves, and (3) wire-line surface-controlled gas-lift equipment.

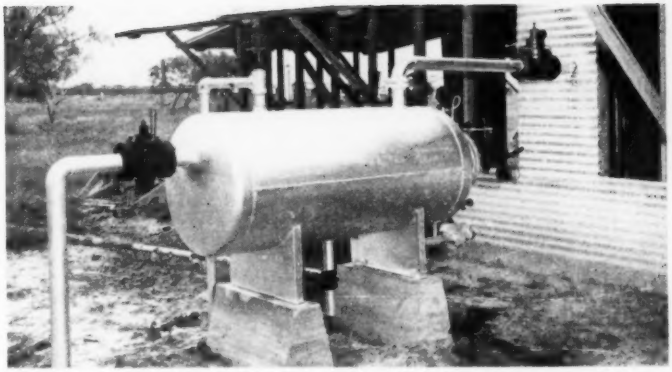
Next, tests were made, using gas from a nearby well, to determine the quantity of gas needed to gas-lift the five wells. The results indicated that approximately 1,000 M.c.f. of gas daily at 500 psi. would be required.

It was then decided to install a closed gas-lift system utilizing portable compressor units to boost the

gas to the necessary input pressure. The operators figured they could purchase enough gas to put the system into operation initially. Formation gas produced with the oil, it was believed, would be adequate to furnish fuel for the engines and take care of minor leaks.

A pair of two-stage 8 by 4¼ by 9-in., 75-hp. compressors were purchased for the installation. Two small units, rather than one larger one, were selected to provide flexibility of operation. Maintenance and repair work can be conducted on one of the units without shutting down the gas-lift operation. Hence, the wells can be produced continually which is important where large amounts of water are produced.

The compressors selected for the job are completely unitized and require only the connection of suction and discharge lines to be placed in operation. Compressor and prime mover are mounted on skids and completely assembled. If the Refugio plant is ever dismantled, for any reason, the portable compressor units can be salvaged and used elsewhere.



There is a separator at each of the producing wells in Grace's gas-lift system. However, in addition the gas is given a second cleaning by this horizontal separator outside the compressor building. This insures that the gas is moisture free before entering compressors

Individual Separators

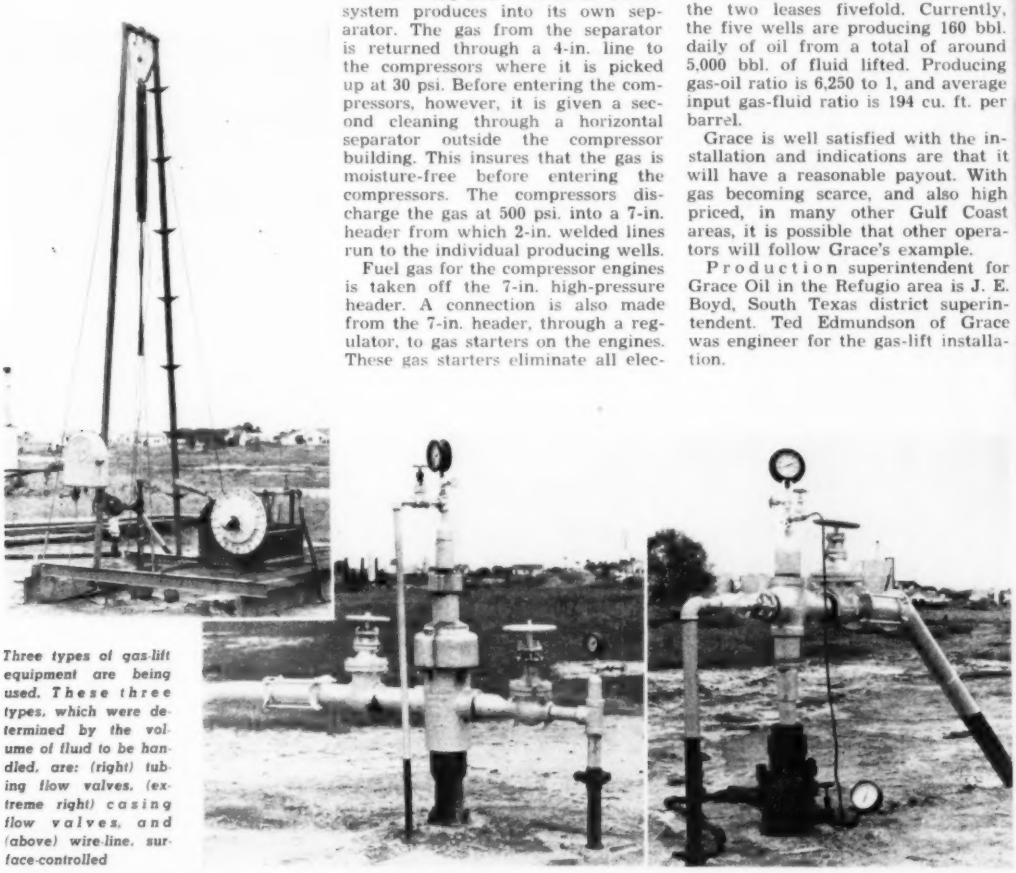
Each of the five wells in the closed system produces into its own separator. The gas from the separator is returned through a 4-in. line to the compressors where it is picked up at 30 psi. Before entering the compressors, however, it is given a second cleaning through a horizontal separator outside the compressor building. This insures that the gas is moisture-free before entering the compressors. The compressors discharge the gas at 500 psi. into a 7-in. header from which 2-in. welded lines run to the individual producing wells.

Fuel gas for the compressor engines is taken off the 7-in. high-pressure header. A connection is also made from the 7-in. header, through a regulator, to gas starters on the engines. These gas starters eliminate all electrical equipment on the engines, other than ignition.

With this newly installed, more efficient method of production, Grace Oil Co. has increased production on the two leases fivefold. Currently, the five wells are producing 160 bbl. daily of oil from a total of around 5,000 bbl. of fluid lifted. Producing gas-oil ratio is 6,250 to 1, and average input gas-fluid ratio is 194 cu. ft. per barrel.

Grace is well satisfied with the installation and indications are that it will have a reasonable payout. With gas becoming scarce, and also high priced, in many other Gulf Coast areas, it is possible that other operators will follow Grace's example.

Production superintendent for Grace Oil in the Refugio area is J. E. Boyd, South Texas district superintendent. Ted Edmundson of Grace was engineer for the gas-lift installation.



Three types of gas-lift equipment are being used. These three types, which were determined by the volume of fluid to be handled, are: (right) tubing flow valves, (extreme right) casing flow valves, and (above) wire-line, surface-controlled

YOU CAN PROFITABLY PRODUCE A LEASE *with* WILSON SUPPLY—INGERSOLL-RAND

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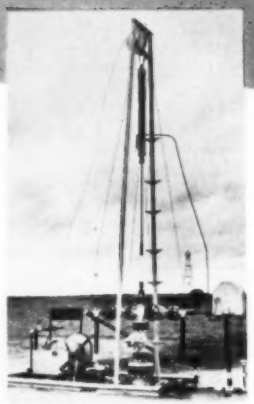


NIXON SURFACE CONTROL Gas Lift Unit—for low Fluid Level Wells.

Proof of the above statement may be found at Refugio, Texas—where 5 wells, making 5160 bbls. of fluid a day—(of which 160 bbls. are oil) are being produced with a "closed" Gas Lift System—using 2 "two stage" Wilson Supply - Ingersoll-Rand "Packaged" Portable Compressors. Four of these wells use tubing or casing Flow Valves, one is using a Nixon Wire Line Surface Control Unit.

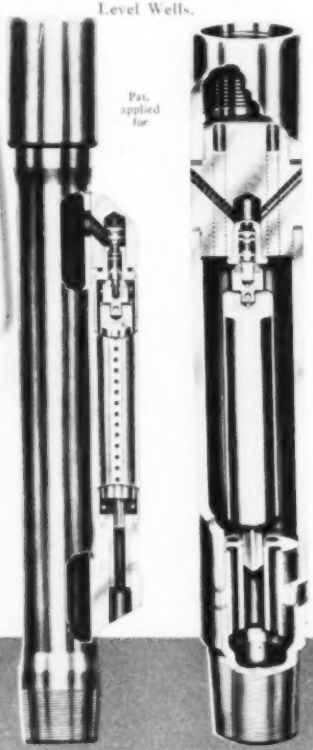
This is the only method by which this lease could be profitably produced—and 160 bbls. of oil a day represents a real recovery and worthwhile profit.

The demand for this outstanding equipment is increasing every month—its economical operation and varied applications being recognized more and more by the Producing and Pipe Line Industries.

These Compressors are mounted on heavy skids and are completely assembled. They require only connecting of the suction and discharge lines to be put in operation. They are readily transportable by truck.

This equipment is so designed and assembled that it may be maintained and serviced by your own field personnel.

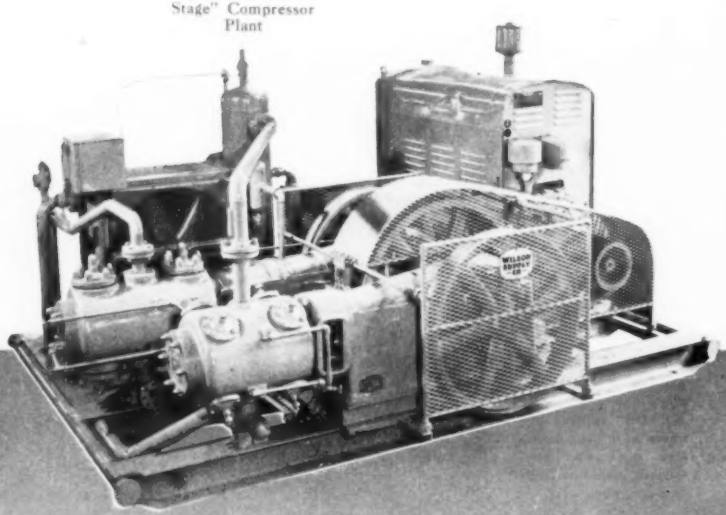
Especially adaptable for Gas-Oil lift and repressuring projects, these units can be furnished to meet specific requirements.



NIXON "Weight Loaded" Tubing Flow Valve

NIXON "Weight Loaded" Casing Flow Valve

Class ES-1 Portable "Two Stage" Compressor Plant



THAT HAS A HIGH WATER-OIL RATIO
"Packaged" PORTABLE COMPRESSORS
GAS LIFT SYSTEM

Pictured in these two pages are both the "Single Stage" and "Double Stage" Wilson Supply - Ingersoll-Rand "Packaged" Portable Compressors. Note their completeness:

— *Horizontal, double acting, water jacketed Compressors, with forced feed lubricator.*

— *Waukesha Engine with combination gas-gasoline carburetor, penn safety switches, clutch, radiator and fan housing, air filter, exhaust silencer, water pump, slide rails, complete electric starter with battery, oil filter, and top cylinder oiler.*

— *Complete V-belt drive including both driving and driven sheaves and V-belts.*

— *Selected radiator type cooler for compressor cylinders, and air-cooled intercooler coil complete with centrifugal circulating pump.*

— *Air-cooled gas intercooler coil complete.*

— *Fuel gas pressure regulator and Volume tank.*

— *Welded and flanged gas line connections.*

— *Thermometer, and Thermometer Welds in all lines.*

— *Inlet Gas Scrubber, with complete Safety Valve, Drain Valve, Pressure Gauge, Armstrong Trap, and explosion proof, Automatic Engine Shutdown, liquid level control.*

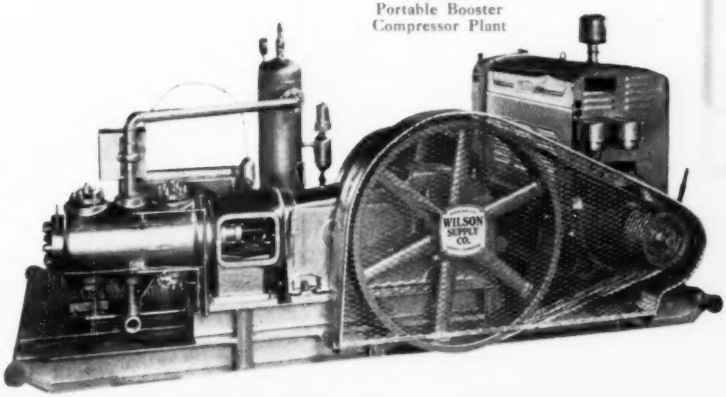
— *All gas and water piping and fittings.*

* — *Ingersoll-Rand Air-Gas Starter.*

* — *Automatic Speed and Pressure controls.*

* — *Optional at extra cost.*

Class ES-1
Portable Booster
Compressor Plant



What Are Your Compressor Needs?

Contact your nearest Wilson Supply Company Store or write "Compressor Division," Wilson Supply Company, P. O. Drawer 19, Houston, Texas, for detailed information, and quotations. Please give suction and discharge pressures and volume to be handled.

WILSON SUPPLY COMPANY

SALES OFFICES: DALLAS—TULSA
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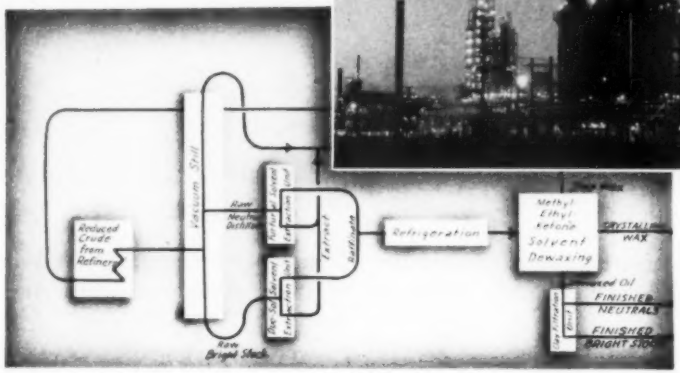
HOUSTON, TEXAS

BRANCH STORES
TEXAS—Alice, Corpus Christi, Victoria, Bay City, Columbus, Barbers Hill, Beaumont, Kilgore, Monahans. LOUISIANA—Lake Charles, New Iberia, Houma, Harvey, Shreveport. ARKANSAS—Magnolia.

Below: The flow arrangement employed in the Cit-Con Oil Corp. lube-oil plant near Lake Charles, La.



Above: This view of the Cit-Con plant shows the furfural unit (left) and the Duo-Sol plant. Input capacity rating on the new lube oil refinery is 6,000 bbl. daily

Cit-Con Lube Plant, Now in Production, One of World's Most Modern

ONE of the world's most modern plants for producing solvent-refined lubricating oil, built and operated by Cit-Con Oil Corp., is now in production. Located near Lake Charles, La., this refinery is a joint enterprise of Cities Service Co., which owns 65 per cent, and Continental Oil Co., which owns 35 per cent. The new plant is designed to produce high-quality motor oils to meet the demands placed on lubricants by the higher operating temperatures and greater bearing loads of today's engines.

Design production capacity of the Cit-Con plant is 6,000 bbl. of lubricating-oil base stocks daily, or 2,100,000 bbl. a year, plus an annual output of 70,000,000 lb. of fully refined paraffin wax. The five base stocks produced by the refinery may be blended to meet specific requirements for automotive and industrial lubricating oils.

In the method of refining utilized by Cit-Con the lubricating fraction of crude oil is subjected to solvents which remove selectively all the naturally occurring unstable compounds. The product resulting from this method is as stable as modern refining technique can produce.

To supply feed stock for Cit-Con, selected crudes are run through one of the 60,000-bbl. per day topping units at the nearby Cities Service refinery. The lubricating-oil fraction is separated and sent to Cit-Con by pipe line. Continental Oil Co. also operates a refinery in the area nearby to the Cit-Con plant.

Many types of crude oil produced in Texas, Louisiana, and Arkansas are being run at the Lake Charles refineries of both Cities Service and Continental. A survey has determined that a large part of this daily input is particularly suitable for high-grade lubricating-oil production. Thus about 10 per cent of the crude having the best properties for the purpose, is refined into lubricating oil.

18,000 Bbl. Daily Flow

At design capacity, volume of the daily flow of feed stock to the new plant is 18,000 bbl. About 6,000 bbl. of the "heart cut" are extracted and the remainder is returned to the basic refinery, where it is processed into other products.

Feed stock for Cit-Con's operations flows first to a twin vacuum distillation unit. Here, the charge is cut into base stocks. The identical towers used in this process are 119 ft. tall and 13 ft. in diameter. The vacuum distillation unit produces as fractionator sidestreams closely cut distillates and a bottom residuum stock for solvent refining. Each of the two identical units has a charging capacity of 12,500 bbl. per day of reduced crude. The lighter grades of vacuum distilled products are refined by the furfural process. Heavier stocks are refined in the Duo-Sol unit.

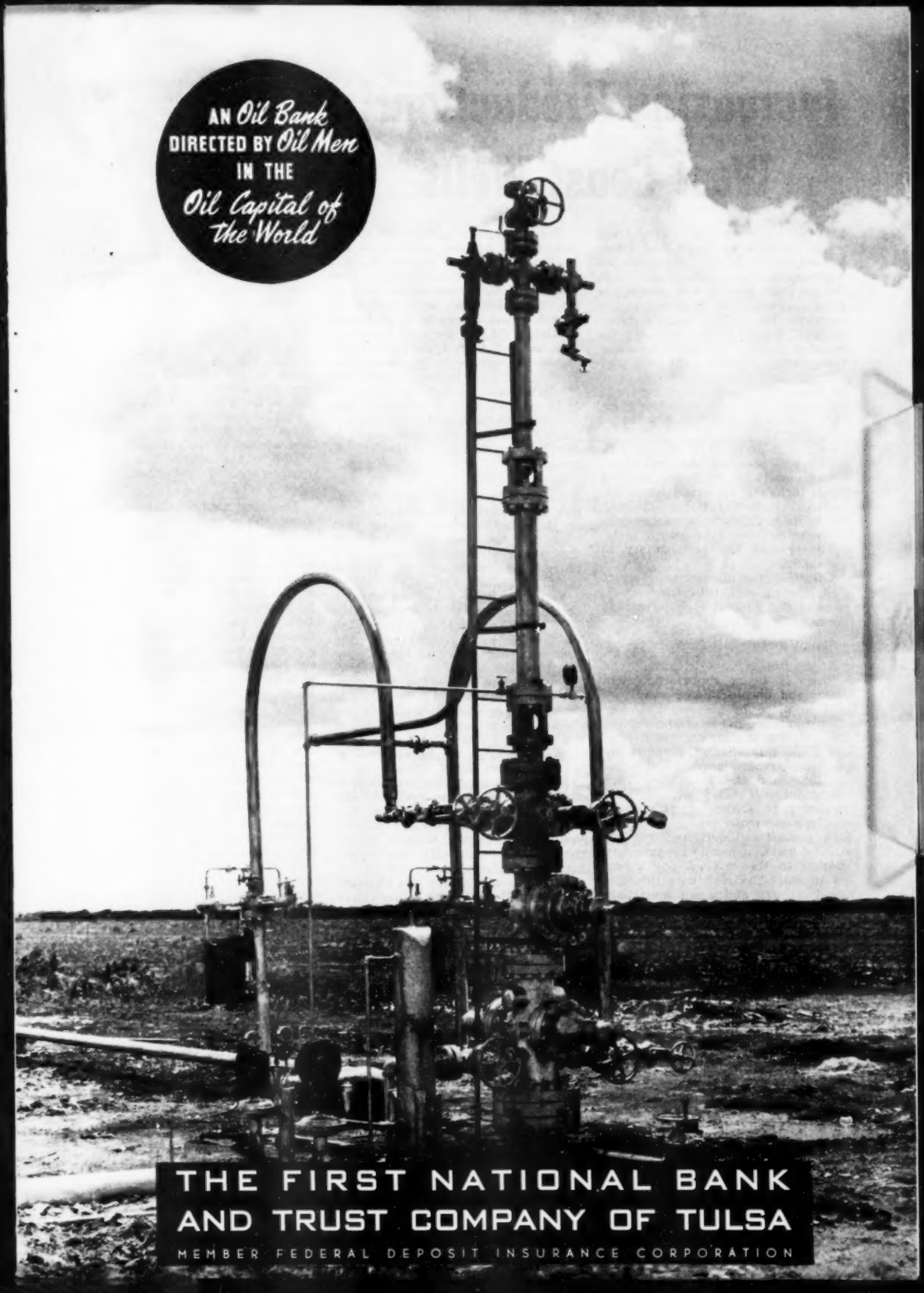
Furfural refining of the lighter grade products removes undesirable constituents. This unit is the largest single furfural refining plant ever built. It is capable of circulating 30,000 bbl. per day of solvent and incorporates several recently developed improvements. The solvent treating tower is 12½ ft. in diameter and 117 ft. high.

The Duo-Sol unit employs propane and a blend of phenol and cresylic acid to remove undesirable compounds from the vacuum unit residuum stock. All or a part of the heavy distillate fraction may also be refined in the Duo-Sol plant. This plant has an oil-charging capacity of 9,700 bbl. per day. It is also the largest of its type. The solvent-treating extractor section has seven extractors 90 ft. long with the largest 10 ft. in diameter.

Dewaxing of all refined stocks is done by a solvent process in which a blend of methyl ethyl ketone, benzol, and toluol is used. There are two of these MEK units. One handles the three lightest distillate stocks. The other processes the heaviest stocks. Dewaxed oils are treated with clay to improve color and stability. The oils are finished in blotter presses.

Refining of crystalline wax to remove odor and taste, and to improve color, is done in an acid-treating plant. Finally, the wax is percolated through bauxite clay. The wax-finishing plant consists of acid treatment and percolation filtration through bauxite for removal of odor and

(Continued on page 89)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Oil Capital of the World
THE FIRST NATIONAL BANK
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Increasing Production in West Coast Wells

The accompanying report is from a recent Los Angeles meeting of the Pacific Petroleum Chapter, A.I.M.E. Contributions to the discussion were made by E. G. Bemiss of Standard Oil Co. of California, on cleaning of gravel-packed liners; by H. D. Aggers of Union Oil Co. on acid treatment and use of knife-type perforation-cleaning tools; by R. Smith of Seaboard Oil Co. on hydraulic formation fracturing; and by a Long Beach Oil & Development Co. engineer on surface experimental work with plugged liners. The report was written by I. A. Marshall, Jr., secretary of the A.I.M.E. group.

WASHING low-gravity wells having unconsolidated sands and interbedded, incompetent, shale bodies becomes more and more important as the production of a well passes the flush period and approaches the economic limit. The basic purposes of well washing are twofold: the removal of drilling fluids, filter cake, and cuttings from the well bore after drilling and, secondly, the removal of asphalt residues, sloughing sands and shales, and any material which accumulates after the well is put on production.

Degree of plugging of the sand face at the well bore has been considerably reduced by improved drilling fluids including low-water-loss muds and muds with oil filtrates. However, all drilling fluids must necessarily form some filter cake which materially reduces the permeability at the sand face.

The following discussions apply to wells having such subsurface conditions of the general type mentioned above.

Plugging of Gravel-Packed Liners

At the time drilling is finished and a liner is being run, incompetent shales and unconsolidated sands are held in place by the mud column. Upon removing the mud and putting the well on production, some sand and shale immediately sloughs into the annulus between the outside of the liner and the well bore. Thus the annulus is filled with detritus consisting of shales, sands, various argillaceous materials, precipitated salts, asphalt residuals, and oil. This mass of material has no permeability relation to the original pay zones, but to enter the well bore the produced oil, gas, and water must pass through it. Plugging of this kind has caused production from one lease to decline from 8,000 to 25 bbl. per day in a matter of several years. By calculation of the oil in place, it was obvious that such a decline is not normal. In cases where this rapid decline has been experienced, new wells drilled on a five-spot pattern will have an initial production very similar to the original wells and will be clean while the original wells may have an appreciable water cut.

Redrilling of wells which have become plugged is not uncommon but it is obviously a very expensive solution, often having poor results unless the well is whipstocked to open up clean sand faces. The most practical and a cheap solution is to remove the plugging material by one of many washing methods. Although comparative data are difficult to accumulate on the effectiveness of various well washes, it has been well determined that the best time to remove the plugging materials is at the time of completion of the well.

Various types of well-washing chemicals and methods are available and, in the opinion of Bemiss, the ideal well wash should have the following characteristics: (1) a cleaning or detergent action, (2) low surface tension to reduce the possibility o f forming water blocks, (3) it should not hydrate (swell) any included clays or bentonites, (4) should not form emulsions with the well fluid, and (5) should be nontoxic to personnel handling it.

A mechanical agitator is commonly used with the various well-washing liquids and many types are available. Some of the agitating tools in common use are: circulation washers (commonly used with oil), mechanical pressure washers used with either oil or washing solutions, and mechanical "surges" used with either oil or washing solutions. Circulation washers are not too desirable because they only give a jet action and necessarily maintain a high fluid head against the formation. Mechanical pressure washers are considered to be better because they give a surging action without maintaining a high fluid head.

Bemiss described a relatively new innovation in well washing known as the "gas pack" which involves the relatively slow (2 to 3 seconds) combustion of a gas-forming material which surges the chemical or oil in the well bore through the liner and on dissipation of the gas pressure the fluid surges back into the hole carrying the plugging materials with it. Very little work has been done with this method so its results are still in doubt. Of well-washing jobs in which Bemiss has been involved, 49 per cent were considered good, 15 per cent marginal, and 36 per cent doubtful. However, the 49 per cent were so successful that they more than paid for the marginal and doubtful jobs.

Experimental surface washings of one 20-ft. and two 10-ft. sections of 6⅝-in., prepacked gravel liners recovered after 1 year of operation in a Ranger-zone well in Wilmington field are shown in accompanying illustrations. The tests consisted of suspending the plugged sections of liner in a derrick and washing through the liner with 27° oil using a mechanical pressure tool. It was found that the perforations broke down at 450 psi. and final washing was continued at 175 psi. As far as can be determined, this was the first formally conducted test in which an actual plugged liner was recovered and washed at the surface where the action of the washer and its effectiveness could be observed and photographed.

The most significant fact obtained from this experiment was that a liner tends to break down over only a fraction of its circumference, thus leaving, in some cases, a large portion of the area of the liner still plugged. Production entering the well thus has to travel in a circumferential direction to a point in the liner where it has access to the well bore. As pointed out by Bemiss, the annulus between the liner and the original well bore is filled with sand, shale, and other material which tends to impede flow around the circumference of the liner.

Perforation Cleaning

H. D. Aggers of Union Oil Co. spoke briefly on the different aspects of acid treatment with string shots and perforation cleaning with knife-type tools. He pointed out that acid should only be used in zones where it could be expected to have some action on the zone and that use of acid in nonreactive formations is not only costly but might have detrimental effects. The use of acid in conjunction with a string shot was first used in 1947 and, although operators differ in the method of use, the most common practice is to first bail the hole clean and then spot the acid and set off the string shot. Some operators prefer the use of a light oil, such as diesel fuel, in preference to the acid and, of course, in the case of nonreactive zones the use of light oils is recommended.

The procedure in detail consists first of bailing all sand or other material from the well, then running the string shot in and out of the hole to be sure that sufficient clearance exists. Then the tubing is lowered to the bottom of the liner, 15 to 20 per cent excess acid is spotted in the liner, and the string shot is again

introduced and set off. The well is put on production immediately. The 22,500-ft. per second velocity of the string shot results in penetration of many of the impermeable zones which would normally not be affected by high volume or a high-pressure washing.

The use of knife-type perforation cleaners is recommended for the removal of clogging material in slotted liners. This method is particularly effective for removing scale, hard sands, or shales and it has been the practice in some fields to run this tool prior to washing to insure that the liner is open. Opening clogged liners with the knife method is also considered good insurance against liner failures because the velocity of the fluid entering the liner is kept to a minimum.

Randolph Smith of Seaboard Oil Co. described his company's experiences with formation fracturing in Bandini Hills field. The purpose of formation fracturing is to increase the entry rate to the well bore by fracturing the pay zone through injection of oil at a high volume and pressure. The well selected for this testing was about 8,000 ft. deep and was producing from hard, relatively impermeable sand and, at the start of the test, was flowing by heads. After formation fracturing had been completed and the injected oil recovered the well production showed a substantial increase with no increase in gas-oil ratio. Production decline was unchanged, however.

Total additional oil recovered by this method was 2,600 bbl. The cost of the operation was approximately $3,600 and indicated a payout period of 41 days. A second attempt was made to fracture this well using twice the injection rate, but there was no indication of further fracturing. From the data presented, it appears that this form of secondary recovery has a definite possibility of success. However, there has not been a sufficient number of wells fractured completely to evaluate the results.

Cit-Con Lube Plant

(Continued from page 86)

taste, and improvement of stability.

Dewaxed oils are clay contacted to improve color and stability. Two identical clay-contacting plants incorporating latest design are used. One will handle the three lightest stocks, and the other, the two heaviest stocks. Each is capable of treating from 2,800 to 3,600 bbl. of oil daily, depending on stock being processed, to improve color and stability.

Special equipment protects finished oils in storage tanks from contamination by water through condensation. Mechanically and chemically dried air flows into the tanks to replace oil being withdrawn.

The refinery's total storage capacity is 1,700,000 bbl., in 134 tanks ranking in size from 300 to 80,000 bbl. The refinery site, a 367-acre tract, is located 12 miles southwest of Lake Charles.

Products are shipped by rail and by water. Wax is produced in 10-lb. slabs, and also is shipped in tank cars. Both blended oils and base stocks may be shipped either by rail tank cars, loaded at the refinery's loading racks, or by water. Loading pipe lines connect the refinery with docks on the tidewater Calcasieu River, 2 miles away. The docks are 28 miles upstream from the Gulf of Mexico. Ocean-going tankers are loaded for deliveries on the eastern seaboard. Most of Cit-Con's production is delivered by barges which serve Mississippi and other river terminals by way of the Intercoastal Waterway, which crosses the Calcasieu River a few miles from the refinery dock.

Construction of Cit-Con's plant was started in November 1947. Processing units were put on stream as they were completed during the last several months. Lummus Co. of New York built all the processing units, with the exception of the Duo-Sol plant, which was constructed by Max B. Miller Co. Walker & Poor Co., architects, designed the administration building.

N.B.

While it is axiomatic that return on investment—*the ultimate earning power* of a refinery unit when actually on stream—is the only true evaluation of competitive engineering recommendations, initial plant costs remain a major factor in refiners' decisions on plant installations. M. W. Kellogg takes specific steps to *minimize initial plant costs* consistent with the achievement of *highest ultimate earning power*.

THOUSANDS SAVED BY CONVERTING OLD EQUIPMENT
Alkylation-Isomerization Unit
NEW METHODS SAVE THOUSANDS OF DESIGN HOURS
Plans Group Plots
CUSTOMER SAVES 35% WITH NOVEL PRE-CAST WALLS
Application of Pre-fa
"TOP" PROCESS DESIGN BASIC TO LOW FIRST COSTS
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SPECIAL PRE-HEATERS REDUCE WELDING TIME IN FIELD
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COSTS CUT 50% THROUGH USE OF KELCRETE
Kellogg Provides Vessel Refractory for about $4/sq. Installed!

. . . AND THAT'S NOT HALF THE STORY

Those eight headlines above, showing how Kellogg searches for methods of keeping down initial costs, give only an indication of the countless ways in which a closely integrated organization can save the customer money.

Sometimes the concepts themselves are not unusual, but the applications are novel. In other cases, exclusive equipment permits Kellogg to do a job better and less expensively. Frequently, the entire idea is a new one. Or, perhaps, it's just years and years of experience that makes the difference.

Kellogg has designed new types of furnaces, adapted war-born methods of insulation to refinery practice. It has improved means of installing pipeways and its construction department has also devised time-and-money-saving methods for steel construction.

Other improvements that mean money in the bank for the customer include new ways for fireproofing, simple means for removing heat exchanger bundles, special techniques for fabricating piping and numerous additional—often exclusive—design and construction features that all add up to major savings.

Economies such as these are only possible when backed, organized and controlled by a complete organization—like that of M. W. Kellogg—where all types of specialists are available for work on the myriad problems involved.

THE M. W. KELLOGG COMPANY

A SUBSIDIARY OF PULLMAN, INC.

ENGINEERS TO THE PETROLEUM INDUSTRY

NEW YORK JERSEY CITY LOS ANGELES TULSA HOUSTON TORONTO LONDON PARIS

Cost-imating

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

A Refinery Cost Index

CONSTRUCTION costs involve costs for labor, costs due to the psychological temper of the times, and costs of the materials employed. Table 1 indicates the proportion of different materials employed in building distillation, cracking, lubricating-oil, and gas (or light hydrocarbons) types of plants.

TABLE 1—BREAKUP OF MATERIALS USED IN PETROLEUM-REFINING PLANTS

	Percentage of cost	Range for different plants
Tubing, pipe, and fittings	9.0	5-13
Steel forgings	3.8	1.7-5.8
Plate	6.5	4.9-8.1
Structural steel	2.2	1.0-3.4
Castings (iron)	2.0	1.4-2.5
Iron and steel	23.5	20.0-25.0
Brick and tile	4.3	0-8.3
Concrete	2.9	1.8-3.9
Insulation and paint	0.6	0.2-1.2
Building materials	7.8	5.1-9.0
Machinery	6.0	2.6-9.0
Electrical equipment	1.7	0.2-3.0
Instruments	2.0	1.0-2.9
Miscellaneous	9.7	7.0-14.0
Total material	41.0	33.9-46.8
Labor, skilled	27.0	
Labor, common	27.0	
Engineering	5.0	
Labor	59.0	53.2-66.1
Material and labor	100.0	

The weekly publications of wholesale prices by the U. S. Department of Labor, Bureau of Labor Statistics, lists the costs or indexes of iron and steel and of building materials. Skilled and common construction labor costs are published each month by the Engineering News Record. No entirely satisfactory sources of the current costs of the machinery, electrical equipment, and control instruments are available. Hence The Oil and Gas Journal will each month publish cost indexes of the items shown on the next page under New Miscellaneous Costs.

The fact that Table 1 shows a labor component of 59 per cent should not be confused with the labor components of 35-50 per cent commonly used by engineering contractors. The iron and steel prices used herein are very low (2 to 4 cents per pound in 1946) whereas the cost of the somewhat finished steel items used by contractors is much higher (6 to 15 cents per pound). Thus, much labor cost is included in what the contractor calls a material cost. The over-all result is that the percentage of labor increases greatly if basic iron and steel costs (as employed here) rather than semi-fabricated steel costs, are used. The hours of labor required do not vary widely, but if radical

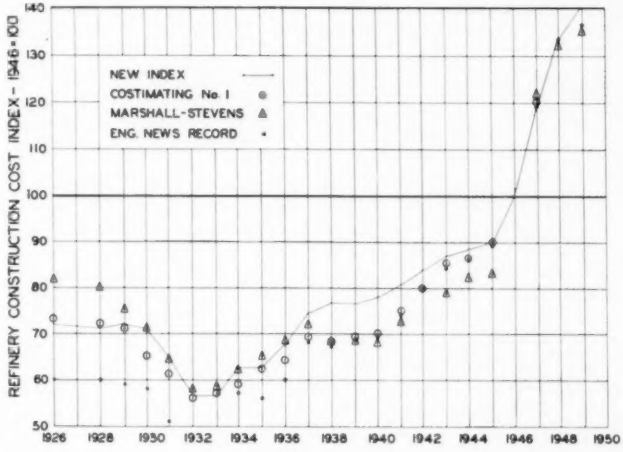

Fig. 1

TABLE 2—NELSON INDEX OF REFINERY CONSTRUCTION COSTS FROM 1926
1946 = 100

Year	Material only: Iron and steel*	Building materials*	Misc. equip., etc.†	Labor‡ only	Nelson index
1926	90.5	75.4	94.0	61.5	**72.0**
1928	81.5	71.0	89.0	64.5	**71.0**
1929	86.0	72.0	87.0	64.5	**72.0**
1930	78.5	68.0	84.0	66.5	**70.3**
1931	73.0	60.0	82.0	60.0	**64.9**
1932	63.0	54.0	79.0	49.0	**56.6**
1933	69.0	58.0	76.0	49.0	**56.7**
1934	76.0	65.0	74.0	55.5	**62.7**
1935	77.0	64.0	76.0	55.0	**62.7**
1936	79.0	65.0	77.0	60.0	**67.3**
1937	94.0	72.0	86.0	66.5	**74.6**
1938	91.5	68.0	81.0	71.5	**76.8**
1939	87.0	68.0	82.0	73.0	**76.6**
1940	86.0	71.0	83.0	74.5	**77.6**
1941	87.0	78.0	84.0	77.0	**80.0**
1942	88.0	83.0	85.0	82.0	**83.7**
1943	88.0	84.0	86.0	86.5	**86.6**
1944	88.0	87.0	88.0	88.5	**88.1**
1945	90.0	89.0	90.0	90.0	**89.9**
1946	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
1947	121.0	135.5	116.0	113.5	**117.0**
1948	141.0	153.0	127.0	128.0	**132.8**
1949 est.	148.0	142.0	125.0	138.0	**139.5**

*Wholesale prices, U. S. Dept. of Labor, Bureau of Labor Statistics, published weekly. †An average taken from Cost-imating No. 1, Oct. 21, 1948, and later issues, and in the future by manufacturer's costs published in The Oil and Gas Journal. ‡Half and half skilled and common construction labor from Eng. News Record.

No. 61 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

changes occur in the future the 40 per cent (or $40) worth of 1946 materials corresponds to 21 hours of skilled labor and 21 hours of common labor (1946).

Refinery Construction Index

The following percentages taken in round numbers from Table 1 are used to compute the refinery construction index:

	Per cent
Materials component (40 per cent):	
Iron and steel	60
Building materials	20
Miscellaneous equipment	20
Labor component (60 per cent):	
Labor, skilled	50
Labor, common	50

No entirely adequate way of checking the accuracy of the new cost index is available. Accurate records of refinery construction costs over the years have not been kept. Only R. W. Stevens (Chem. Eng., November 1947, page 124, and each quarter in Chem. Eng.) and W. L. Nelson (Cost-imating. November 1, October 21, 1948) have stated refinery construction indexes. These are compared in Fig. 1 with values computed by the new index (see Table 2). Although the E.N.R. (Engineering News Record) index does not apply to refinery construction, it is also shown because it is probably the most widely known construction index.

The new index checks the other petroleum indexes reasonably well except during the years 1926-1923, and 1937-1944, but the new index is probably more accurate than the older indexes. The Cost-imating index of 1948 by Nelson is not much of a check because in part it was based on the Marshall-Stevens index. The new index does not check the E.N.R. construction index except during 1945-1948, but this is to be expected because the E.N.R. index does not properly apply to the process-type construction encountered in the refining industry.

Here Is the New Index

THE following box is an illustration of the Nelson index as it will appear in the first issue each month of The Oil and Gas Journal. Executives, boards of directors, etc., should find the new Journal feature useful in preparing budgets or planning construction programs.

NELSON REFINERY CONSTRUCTION INDEX

Appears in the first issue of each month.
Explanation—Cost-imating No. 61, December 15, 1949.
Compiled by W. L. Nelson—Refinery Consultant—Tulsa.
Indexes of Individual Equipment Items—January, April, July, and October.

INDEX (1946 = 100)

	1947	1948	Sept. 1949
Centrifugal pumps	109.0	120.0	119.0
Reciprocating pumps	130.1	143.1	146.6
Compressors	114.0	128.0	117.0
Engines	109.0	120.0	110.0
Motors	*122.0	*135.0	*130.0
Transformers	*122.0	*135.0	*130.0
Instruments	†113.0	†120.0	†123.0
Misc. equip. ave.	*117.0	*128.7	*125.1
Materials component	123.0	140.5	143.0
Labor component	113.5	128.0	139.5
Ref. const. index	117.1	132.8	140.6

*Subject to revision. †Revised estimate.

Just to start those who compute, here is how the new index is computed for September 1949:

From Wholesale Prices, U. S. Dept. of Labor, Bureau of Labor Statistics:

Iron and steel index		
		On 1946
1926	100	90.5
1946	110.3	100.0
Sept. 1949	164.2	149.0
Building-materials index		
		On 1946
1926	100	75.4
1946	132.6	100.0
Sept. 1949	189.4	143.0

Miscellaneous Equipment Index

(See this page and Nelson Refinery Construction Index.)

The materials component (40 per cent) for September 1949 is:

0.6 × 149.0 = 89.4
0.2 × 143.0 = 28.6
0.2 × 125.1 = 25.0
Materials component 143.0

The labor component from the Engineering News Record (September 8, 1949, page 6) is:

Skilled 0.5 × 136 = 68
Common 0.5 × 143 = 71.5
Labor component 139.5

The complete Nelson Index of Refinery Construction:

Material component 0.4 × 143 = 57.1
Labor component 0.6 × 139.5 = 83.5
Complete index 140.6

Quarterly Cost-imating Indexes

In addition to the new construction index, each quarter The Oil and Gas Journal will publish as many indexes as possible of individual items of equipment such as plate steel, exchangers, pipe, insulation, etc. The purpose is to permit cost estimates to be made in the future by correcting the basic costs of the Cost-imating series (which terminates this month). A discussion of price trends or related topics will also be included in the quarterly review of costs.

New Miscellaneous Costs

Another new feature is the monthly cost indexes of machinery, instruments, and electrical equipment which will appear in the Refinery Construction Costs box. To our knowledge no other current source of the costs or indexes of these items of equipment is available. The following costs are being obtained from manufacturers each month.

Motors[1]—squirrel-cage, induction. Class I and Group D, explosionproof, horizontal, enclosed, fan-cooled, 1,800-r.p.m., 3-phase, 60-cycle, 220/440 volt (subject to revision):

20 hp.	$ 278 (1946)
75 hp.	903
200 hp.	2,210

Transformers[1]—single-phase 60-cycle, 2,400-volt primary, 240/480 secondary, oil-immersed, self-cooled. (No lightning arrestors or cutouts.) (Subject to revision):

100 kva.	$ 505 (1946)
250 kva.	1,080
500 kva.	1,700

Centrifugal pump[2]—cast iron, 60-g.p.m., 150-ft. head, 7½ hp., 3,600-r.p.m., low-temperature. (No motor)—$474.

Centrifugal pump[2]—Steel, 900 g.p.m., 250-ft. head, 75-hp., 3,600-r.p.m., high temperature. (No motor)—$1,050.

Reciprocating pump[3]—6 by 4 by 6 duplex general service, horizontal, piston-type, cast-iron, 250-lb. liquid end—$213.

Reciprocating pump[3]—8 by 4 by 12 simplex, close-clearance, horizontal, piston-type, C.I. and semisteel, 600-lb. liquid end—$433.

Gas engine[4]—175-hp.—$10,400.

Diesel engine[4]—700-hp.—$38,200.

Compressor[4]—1,000-hp., gas-engine drive with 16-in. cylinders—$61,500.

Potentiometer[5]—6-pt. recorder—$600.

Potentiometer[5]—air-control recorder—$475.

Thermometer[5]—recording controlling (100 ft. tubing and socket)—$291.

Flow meter[5]—mechanical recording—$190.

Flow meter[5]—air-control mechanical—$295.

Flow meter[5]—remote pneumatic, transmitter and receiver (air control)—$429.

Pressure controller recorder[5]—$225.

Pressure gage[5]—0-1,000 lb., 6-in. steel—$19.80.

Valve[5]—control, 2-in. cast steel—$144.

References

1. General Electric Co., Type K and Type H.
2. Worthington 1¼ HR—1 and 4 HR-3.
3. Worthington General Service and Hivol.
4. Worthington Pump & Machinery Corp.
5. Brown Instrument Co.

TESCO IS EQUIPPED TO CAST THE BIG ONES!

THIS 30" PIPE LINE CHECK VALVE casting measures five feet long, five feet high and weighs 7000 lbs. It is typical of the large castings which TESCO regularly produces for pipeline equipment manufacturers. Removing risers with acetylene torches, as shown here, is one of TESCO's finishing operations. Grinding, sandblasting and rigid final inspections will assure the equipment manufacturer of a strong, sound casting which will require minimum machining. Let the TESCO Representative show you how steel castings can help you produce stronger, better appearing products at less cost. TESCO is the most experienced foundry on the Gulf Coast. TEXAS ELECTRIC STEEL CASTING COMPANY, HOUSTON, TEXAS.

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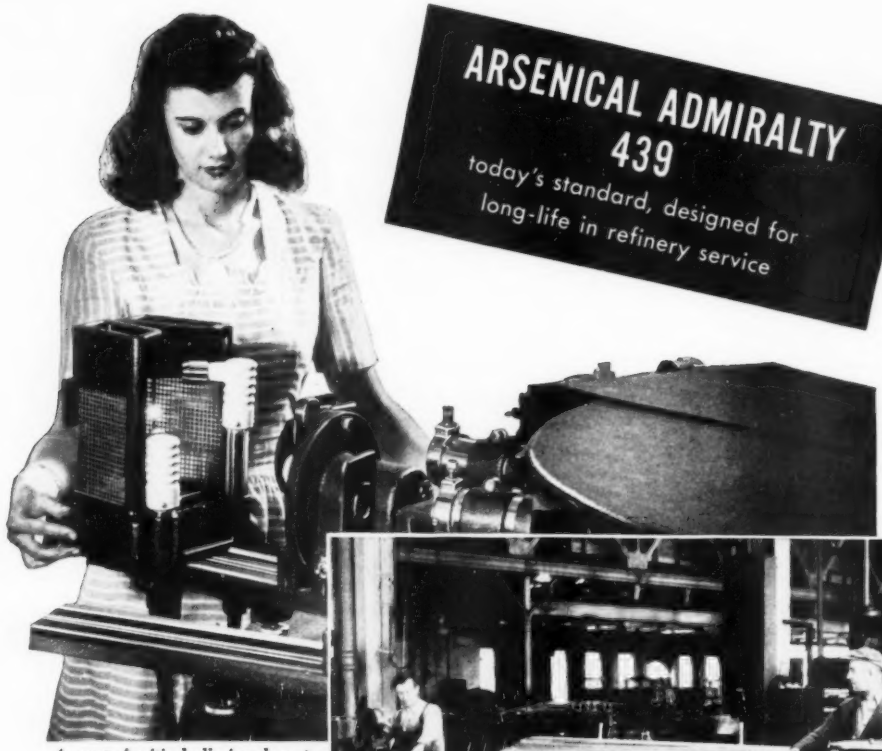

Amount of critical alloying elements is checked in the laboratory with the help of this grating-type spectograph.

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QUESTIONS on TECHNOLOGY

by W. L. Nelson
Consulting Engineer

Comparison of Lead Susceptibilities of Gasolines

What are the relative lead susceptibilities of catalytic and thermal cracked gasolines?—L. C. R.

There is no very convenient way to compare the lead susceptibilities of different gasolines except by plotting or tabulating their octane numbers. This has been done in Fig. 1 on this page which compares the octane numbers (with lead) of (1) high and low-sulfur straightrun gasolines, (2) desulfurized straightrun gasolines, (3) thermally cracked gasolines, (4) catalytically polymerized gasolines, (5) catalytically cracked gasolines, and (6) various typical isooctanes, alkylates, hydrocodimers, etc. The clear octane numbers used in Fig. 1 should not be taken as typical of the various stocks—they were selected merely so that the lines would be spread apart on the chart for ease in reading.

It is nearly impossible to compare fairly the lead susceptibility of thermally and catalytically cracked gasolines because their clear octane numbers are different. Thus, about the highest octane number of thermally cracked gasoline is about 70 (although vapor-phase gasolines are sometimes 73) and the lowest octane number for common catalytic gasolines is about 76. The nearest thing to a comparison of the lead susceptibilities of thermally and catalytically cracked gasolines are the somewhat misleading figures given in Table 1. They are called misleading because they tend to indicate that catalytic gasolines have a poor lead susceptibility which probably would not be true if gasolines of the same clear octane number (see the hypothetical column in Table 1) could be compared. The hypothetical values were obtained by extrapolation.

The susceptibilities shown here were taken mainly from numerous Questions on Technology and other articles in The Oil and Gas Journal, as follows:

1. Lead Response—Straightrun and Natural Gasoline, October 6, 1945 (over 280 specimens reported).

2. Lead Response—Cracked and Other Stocks, October 13, 1945.

3. Lead Response of Gasolines (straightrun and natural), October 13, 1945.

4. Lead Susceptibility of Catalytically Desulfurized Gasolines, October 27, 1945.

5. Lead Susceptibility of Cracked and Reformed Gasolines, November 10, 1945.

6. Octane Properties of Poly Gasolines, November 24, 1949.

7. Lead Susceptibility of Catalytic Gasolines, October 27, 1949.

8. Lead Susceptibility of West Texas Gasolines, August 26, 1944, p. 111.

9. Typical Lead Responses, November 27, 1941, pp. 68-70.

These articles report experimental results on several hundred gasolines. Only the motor method of testing is discussed here but in general the lead susceptibility by the research method is the same or a little better than by the motor method.

TABLE 1—INCREASE IN MOTOR OCTANE NUMBER UPON ADDING TEL

	Typical poly gasoline	Typical thermally cracked	Typical catalytically cracked	Hypothetical— Thermal	Catalytic
Clear octane number	82	68	79	both 74	
Increase with TEL:					
1 cc.	2.0	5.6	4.8	3.2	6.4
2 cc.	2.9	8.2	6.4	4.7	8.2
3 cc.	3.4	9.6	7.3	5.3	9.2
6 cc.	4.3	11.5	9.3	6.2	10.6

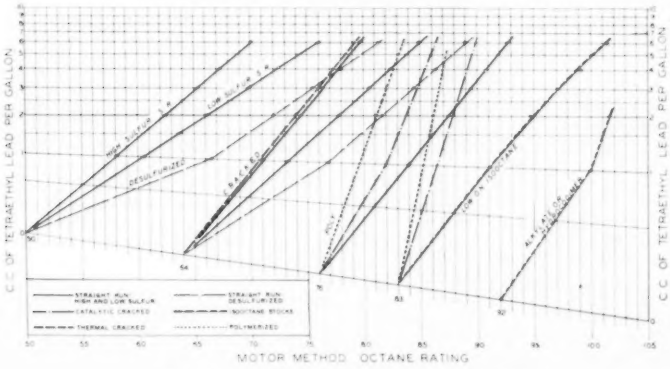


Fig. 1—Lead susceptibilities of typical gasolines

Heat Losses from Pipe Lines

We are not aware of any textbooks or articles which deal systematically with the flow of heat from buried pipe lines into the ground. Can you direct us to articles please?—W. W.

A theoretical derivation of the flow of heat from a pipe line, or a mathematical treatment could be derived without too much difficulty, but such a derivation would be of little practical value because the physical constants, thermal conductivities, etc., are not available. This difficulty arises primarily because the amount of moisture in the soil varies widely and in fact changes constantly.

There have, however, been several discussions of this or related subjects, as follows:

References

1. Nelson, W. L., Cooling Gas by Coils in Ground, The Oil and Gas Journal, October 3, 1949, page 51. This is a most general discussion of the mechanism of heat transfer.

2. Nelson, W. L., Vaporization from Buried Butane Tank, The Oil and Gas Journal, February 27, 1941, page 89. This is much the same as Reference 1 above, except that the effect of vaporization in reducing the tank temperature is introduced.

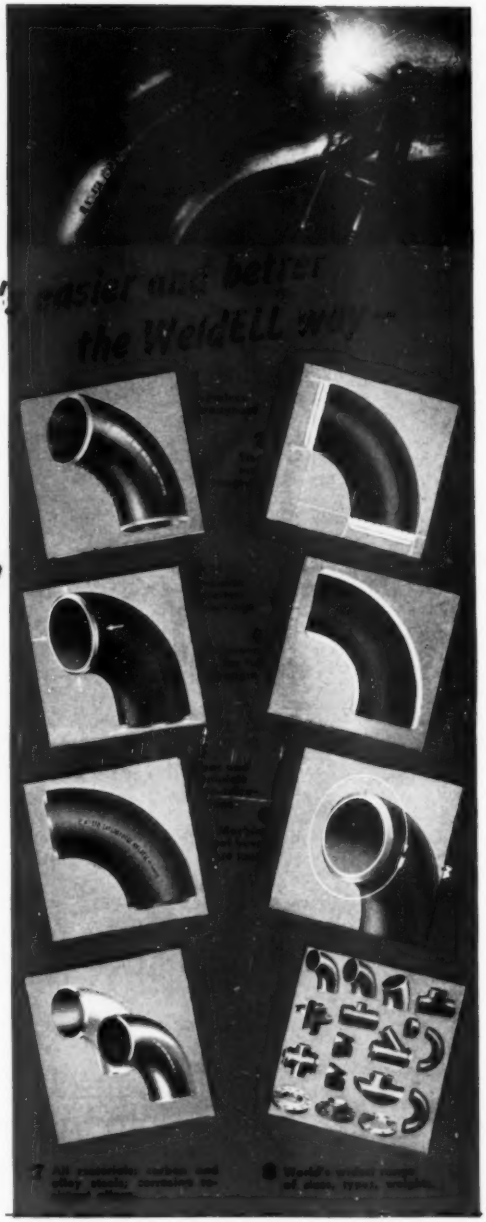
3. Johnston, C. N., Heat Conductivity of Soil Governs Heat Losses from Heated Oil Lines, Pet. Engineer, October 1937, page 41. This is one of the best articles on this subject.

4. Nelson, W. L., Conductivity of Soil, The Oil and Gas Journal, September 15, 1945, page 110. Many conductivities are listed and a somewhat unsuccessful attempt is made to relate conductivity to soil density.

5. Karge, F., Design of Oil Pipe Lines, Pet. Engineer, April 1945, page 184. A tabulation of soil conductivities is presented.

6. Martin and Heltzel, Temperature Observations for One Year, Streams of Petroleum Flowing in Mid-Continent Oil Pipe Lines, A.S.M.E. meeting, October 6-8, 1930.

7. Nelson, W. L., Viscosity at Pipe-Line Temperature, The Oil and Gas Journal, January 12, 1946, page 87. An approximate relation between mean weather temperatures and the temperatures in pipe lines is introduced.



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TRADE LITERATURE

1 INSTRUMENT VALVES provides information on new drop-forged-steel instrument valves for meter, gage, instrument, and other small lines. *Edward Valves, Inc.*

2 CENTRIFUGAL PUMP INSTALLATION AND OPERATING MANUAL. A revised instruction booklet on the installation and operation of centrifugal pumps in corrosive service, deals with proper location and foundations for pumps, correct alignment, priming standard pumps, proper piping arrangements, adjustment of impellers, and common troubles and how to overcome them. *Duriron Co., Inc.*

3 BJ AIR COMPRESSOR. A bulletin with complete information on the air compressor designed especially for use with the BJ pow-airmatic tubing tong. Available in both trailer-mounted models and skid mounted. Specifications, pictures of the units, and other data on the BJ trailer are included. *Byron Jackson Co.*

4 MACHINE GAS CUTTING SLIDE CHART. This oxyacetylene machine gas cutting slide chart, introduced in 1946, has been reprinted. By sliding the chart to the indicated tip number, oxygen and acetylene pressures, speed in inches per minute, gas consumption, and approximate width of kerf are read down one column. *Air Reduction Sales Co.*

5 CENTRIFUGAL AND AXIAL FLOW COMPRESSORS. Illustrated with both photographs and cross-sectional drawings, this 32-page book is composed of four articles: "High-Pressure Centrifugal Compressor Applications," "Commercial Applications of Centrifugal Compressor and the Complementary Axial," "Centrifugal Compressors for Pipe-Line Duty," and "The Gas Turbine, Particularly as Applied to the High-Pressure Centrifugal Pipe-Line Booster." *Clark Bros. Co., Inc.*

6 ALGRIP describes an abrasive steel floor plate for industrial plants. General information on installation and recommended thickness figures are given. *Alan Wood Steel Co.*

7 MODELS U-34 AND U-34D, SINGLE AND DOUBLE-DRUM ROTARY DRILLING UNITS is a 16-page presentation of outstanding features of these units. A description, photograph, and blueprint of each of the components effectively tell the story. *Unit Rig & Equipment Co.*

8 UNITED COOLING TOWERS is a four-page, two-color folder illustrating 16 models of cooling towers being used in as many applications. *United Cooling Tower Co.*

9 INTERNATIONAL FREIGHT FORWARDERS. This six-page folder deals with the services offered in forwarding shipments to ports outside the United States. It lists all the services this Houston firm is pre-

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OIL AND GAS EQUIPMENT Digest NEWS CHECK IT

pared to offer in shipping to foreign countries. *South Ports Forwarding Co.*

10 W. & J. AIR STARTER lists the advantages of the air-starting motor and illustrates all component parts. Of particular interest is a tabulation of the results of numerous tests. *Williams & James.*

11 BUCKEYE MODEL 306 UTILITY DITCHER. New eight-page color bulletin emphasizes the many features in the Model 306 ditcher and lists the varied applications. *Findlay Division, Gar Wood Industries, Inc.*

12 SELECTOR AND COMPARISON CHART of hardfacing rods and electrodes. This chart lists each of Amsco's welding rods and electrodes and indicates the type of service for which each is designed. *American Manganese Steel Division of American Brake Shoe Co.*

13 BRONZE GATE VALVE. A brochure contains full and informative description of the figure 27 and figure 30 lines. Design features of the two valves are explained in detail with a large sectional drawing. Service ratings and a comprehensive table of sizes and dimensions are included. *Kennedy Valve Manufacturing Co.*

14 CORROSION INHIBITION IN RECIRCULATING WATER SYSTEMS. Five types of corrosion control are discussed: anodic polarization, cathodic polarization, preventing harmful deposits, removal of corrosive constituents, and adjusting the pH. Many practical applications are given. *Mutual Chemical Co.*

15 PAUL VENTURI-BALL VALVES. A new 16-page catalog covers principle of operation and engineering data on the complete line, including "whistle" valves, bar-stock valves, cast and stainless steel valves, and forged valves. *Paul Valve Corp.*

16 FLUID PISTON-ROD LUBRICATING SYSTEM FOR POWER SLUSH PUMPS describes a system originally designed for Ideal E-700 and C-350 pumps, now available for Ideal C-250 and C-150 power pumps, and for pumps of other makes. *National Supply Co.*

17 MACHINERY NO. 3 is a beautifully bound, thoroughly illustrated, 750-page, oil-field-machinery catalog. No effort has been spared in making this book a listing of real value and service to the industry. In addition to being thoroughly indexed, this directory of oil-field machinery is sectionalized by three principal divisors, i.e., drilling, production, and pipe line. Each section is independently indexed. Every item listed is illustrated and pertinent description and engineering detail are included. *Continental Supply Co.*

18 INDUSTRIAL THERMOMETER DATA. Complete data on liquid-in-glass industrial thermometers are presented in an easy-to-use tabular and sectionalized form. Graphic pages illustrate all basic models, sizes, forms, and attachments with simplified application data to enable the user to select the proper thermometer for any industrial installation. *Precision Thermometer & Instrument Co.*

19 IMPROVED EQUIPMENT-CLEANING PROCEDURES. The six equipment-maintenance operations featured in this series, with an individual pamphlet devoted to each, are: cleaning and descaling heat exchangers; cleaning and paint stripping storage tanks; cleaning tank car interiors; salvage cleaning; chemical-circulation cleaning of absorption, stabilizing and fractionating towers; and drum washing and reconditioning. *Oakite Products, Inc.*

20 DE LAVAL-IMO PUMPS. This catalog shows cutaway drawings of six types of IMO rotary pumps, along with a brief description of each. The IMO pump is designed to handle residual and distillate fuel oils, crude oils, all grades of lubricating oils, hydraulic oils, viscous fluids, and liquids of similar characteristics. *De Laval Steam Turbine Co.*

21 CONSTAMETRIC PUMP, describes a duplex plunger-type positive metering unit that discharges in a straight-line flow free from pulsations. By means of cam drives the two plungers afford a pumping action the same as that of a single plunger of infinite length moving forward continuously at a fixed rate of speed. *Milton Roy Co.*

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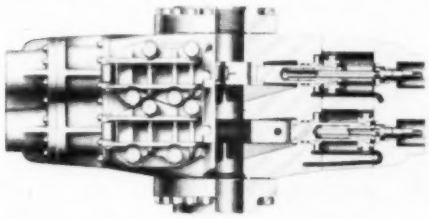
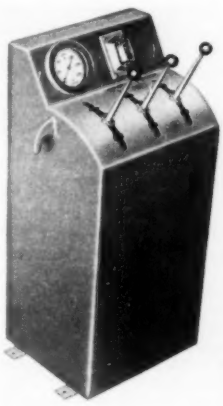
OIL AND GAS EQUIPMENT Digest

IT'S NEW ✓ CHECK IT

by Dan B. Miller

22 HYDRAULIC CELLAR CONTROL GATE features two gates in one, unusual compactness, fast ram changes, quick-draining body and direct hydraulic drive. The two separate ram compartments unitized into one compact body actually comprise two hydraulic gates in one. All operating parts in the hydraulic cylinder are either stainless steel or manganese bronze. There are no moving parts projecting from the gate. All moving parts, in the hydraulic cylinder, including piston-rod ram shafts and locking shaft are completely enclosed. Control of power closing unit and opening and closing of the rams is centralized in a compact unitized control panel that can be placed alongside the driller or at any other convenient location. Manufacturer recommends that hydraulic oil in a closed system be used to operate Hydraulic gates; however, water can be used without risk of corrosion, rust, or damage to parts. Two types of power closing units are available, one operated by electricity, the other by air, gas, steam, or water. *Shaffer Tool Works.*



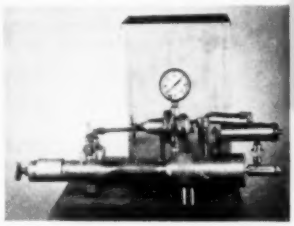


IT'S NEW ✓ CHECK IT

23 TYPE "R" WIRE-LINE OIL SAVER is designed and built for safe, efficient low-cost cleaning and wiping of wire line during swabbing, bailing, and other well operations. It is a split type made in two halves with only two bolts to insert and tighten. The body is high-grade malleable iron casting and the mating surface of each half is carefully ground for a perfect fit. A permanently fixed dowel pin in each half of the body assures perfect thread alignment. Safety handles fold down out of the way when not in use and are connected to the screw by a strong heat-treated pin. Handle, screw, plate, and shoe are assembled as a unit and only two bolts need be removed on each side to insert new rubbers. Made in two types, the type "R" wire-line oil saver may be used singly, in pairs, or in stacks of three. The single-pin type is a low-cost oil saver. Double-pin type may be used below the single-pin oil saver enabling the operator to swab with the greatest amount of safety. *Guiberson Corp.*

IT'S NEW ✓ CHECK IT

24 NEW CHEMICAL INJECTION PUMP designed to accurately inject from 2 oz. to 20 gal. of light or heavy fluids over any given 24-hour period has a pump speed range of from 5 to 150 s.p.m. with a normal operating speed of 60 s.p.m. It has an operating pressure range from 0 to 60 psi., and a normal operating pressure of 30 psi. Has only two moving parts, a main piston and valve. The pump has a positive 1-in. stroke which provides constant injection of fluid with no lost motion. The pump is constructed of brass or bronze and is unaffected by temperature changes. *McFarland Manufacturing Co.*



IT'S NEW ✓ CHECK IT

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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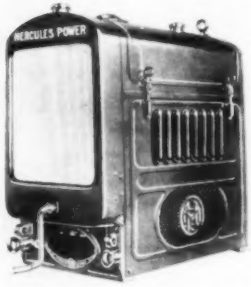
OIL AND GAS EQUIPMENT Digest — IT'S NEW — CHECK IT

25 ROSIN AMINE D ACETATE, (called "RADA"), is being successfully used by the petroleum fields where the extraction of crude petroleum depends largely on water-injection recovery methods. This new chemical provides control of bacterial action and affords protection against corrosion of water-flooding systems. Rada also acts to reduce turbidity in flood water thereby preventing plugging of oil-bearing sands. It is adaptable to a wide range of flood waters. No expensive equipment or complicated methods of application are required. *Hercules Powder Co.*

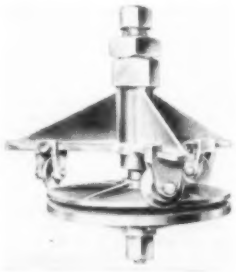
IT'S NEW CHECK IT

26 NEW HERCULES POWER UNITS. Three new four-cylinder gasoline power units, models JX4E, JX4C, and JX4D, provide power users with a broader choice to more economically meet their specific power needs. The models, JX4E, 3½-in. bore by 4¼-in. stroke and 164-cu. in. displacement; JX4C, 3¾-in. bore by 4¼-in. stroke and 188-cu. in. displacement; and JX4D, 4-in. bore by 4¼-in. stroke and 214-cu. in. displacement, reduce the power spread which has existed between Model IXB5 four-cylinder power unit of 133-cu. in. displacement, and the Model QXC5 six-cylinder power unit of 221-cu. in. displacement. All three units are designed for high-speed, heavy-duty service in industry where portable power can be used to advantage. Petroleum industry and construction field will particularly find these two sizes adaptable in their open, closed, or base-type mountings. *Hercules Motors Corp.*



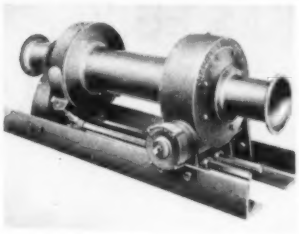
IT'S NEW CHECK IT

27 UNITANK FLANGE CUTTER operates on a simple combination punching and shearing can-opener principle. It is easy, quick, safe, and efficient for cutting any thickness of steel up to and including ⅞ in. A small hole large enough to accommodate cutter shaft is drilled or punched in tank or sheet steel. Threaded cutter shaft is inserted and back plate is bolted on to shaft from inside the tank. Outside cutting wheels, guided by outside guide plate, punch and shear accurate hole of desired diameter. Guide and backing plates or disks are provided for sizes 2 to 6-in. For ½ and 1-in. flanges, smaller cutters are available. *American Pipe & Steel Corp.*



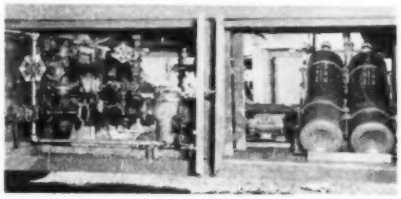
IT'S NEW CHECK IT

28 HEAVY-DUTY TRUCK WINCH carries a safe working load rating of 20,000 lb. and is suitable for mounting on trucks of 1½ to 3-ton rating. Other models soon to become available will be of 6,000, 10,000, 15,000, and 30,000-lb. rating. Gear case is built flush with drum, and all reinforcing is on the inside of the gear case. Gear-case design makes it impossible for winch line to become wedged between the case and the drum. Gear case and all other castings are of certified malleable iron, including capstans. Ratio of the worm and gear is 40 to 1, which is slightly slower than most winches. Slower ratio produces an even pull at a more desirable line speed, and works especially well with some late-model truck transmissions having faster ratios. *Ramsey Winch Manufacturing Co.*



IT'S NEW CHECK IT

29 CARBON DIOXIDE SYSTEM installed in a 4,120-gal. L.P.G. trailer truck has two built-in carbon dioxide fire-extinguishing systems protecting both the tractor engine and the trailer pump compartment. Directly behind driver's cab is a 20-lb. cylinder of compressed carbon dioxide equipped with automatic discharge head, mounted on an angle-iron frame. Release-valve mechanism is connected by copper tubing to two Luxstat fire detectors under the tractor engine hood. Rigid piping leads from cylinder discharge head to perforated tubing surrounding the engine and to multijet nozzles at engine-bed level. Protection for trailer pump compartment consists of two 35-lb. cylinders of carbon dioxide with similar connections to six Luxstat detectors and 10 multijet discharge nozzles, directed downward to concentrate discharge on strainer, manual releases in cab are also provided. *Walter Kidde & Co., Inc.*



IT'S NEW CHECK IT

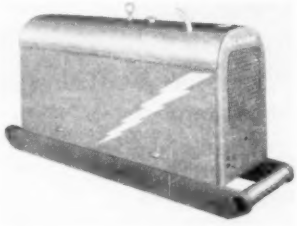
30 NEW LO-HEAD CRANE BLOCK in capacities from 10 to 50 tons is now available for all types of hook work. The block, with its shorter over-all length, permits 1½ to 2-ft. higher lifts without lengthening the boom. The forged hook operates on Timken tapered roller bearings and the cast-steel sheaves are equipped with Hyatt Hi-Load bearings. Lubrication is necessary only once each 2,000 hours. Alemite fittings are provided for standard grease-gun use. *American Hoist & Derrick Co.*

IT'S NEW CHECK IT

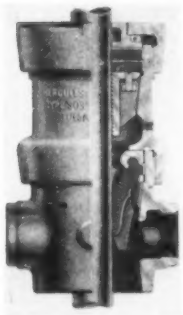
31 CHEMICAL-RESISTING GENERAL MAINTENANCE PAINT. Chemical resistance of Ucilon 1701 has been designed to be of service where ordinary oils or oleoresinous paints are not or have not proved satisfactory. Ucilon 1701 is of real advantage in contact with acid and alkali fumes, moisture, vapors, grease, and oils. It is recommended as a coating for floors, walls, ceilings, exteriors or storage tanks, structural steel, and exteriors of process equipment and machinery. It can be applied over old paint or other surfaces without priming and without sandblasting or other expensive surface treatments. Loose rust and scale, however, should be removed. Coverage is between 350 and 500 sq. ft. per gallon. *United Chromium, Inc.*

IT'S NEW CHECK IT

32 BEACON LIGHT PLANT. An electric generator with a single solid moving part is a progressive development in portable generator plants. Brushes, slip rings, and commutator are eliminated in this machine. Skid-mounted gasoline-engine-powered units have been field tested and are in use by contractors for the three-fold purpose of rig lighting, welding, and pipe thawing. Only moving part is a one-piece, permanent-magnet rotor. The stator or armature is wound with $\frac{1}{8}$-in. copper, silver soldered at the joints. These features, coupled with the electrical characteristics of the generator, make it burnoutproof. A transformer assembly is furnished with the generator unit to provide required voltage variations. The generator is nonsparking, making the unit desirable for use in a hazardous gas-filled atmosphere. *Midwestern Engine & Equipment Co.*



IT'S NEW CHECK IT



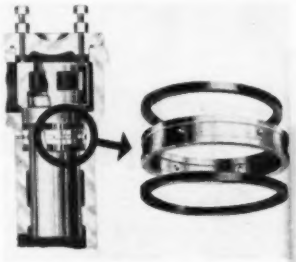
33 STRIPPER TUBING HEAD, TYPE SOS AND SO can be completely interchanged in many new combinations. All size parts will interchange in all size heads. The top section containing slips and overhead packing can be interchanged with the tubing stripper in the bottom section. It is made in $4\frac{1}{2}$ to 7-in. o.d. casing sizes and will support 2, $2\frac{1}{2}$, or 3-in. plain or upset-thread tubing. Two strippers may be used simultaneously, or if tubing is being run or pulled with one stripper, a second stripper can be installed in the top section if required. The bottom section may be used as a tubing head by inserting slips and packing into lower section. *Hercules Tool Co.*

IT'S NEW CHECK IT

34 MOLDED HARDBOARD SHEATHING is a special folded sheathing for pipe-line pipe to prevent damage to pipe wrapping during the process of lowering pipe into the trench. This sheathing is formed into semicircular shape, is placed around the pipe, and is held in place by steel strapping. It is supplied in a full range of widths for pipe up to 36-in. diameter. It is an especially tough material, and as it is supplied in thicknesses of $\frac{1}{8}$, $\frac{3}{16}$, and $\frac{1}{4}$-in. it resists tearing, or galling, or fracture of the pipe wrapping by whatever sling or other mechanical apparatus is used in lowering the pipe. *Protective Papers, Inc.*

IT'S NEW CHECK IT

35 TELL-TALE LINER PACKING ASSEMBLY for slush pumps consists of two sealing rings separated by a steel lantern ring. Leakage can be detected immediately at the "tell-tale hole" drilled through the cylinder in line with the center groove of the lantern ring. Liners can be replaced before costly fluid cuts in pump cylinder can occur. Lantern rings are precision machined from steel forgings and are processed against corrosion. They may be used over and over without replacement. Dia-Tex sealing rings are precision molded and highly resistant to oil, gas acids, and most chemicals. They have a minimum tendency to cold flow under compression and are especially recommended for high temperatures and pressures. *Oil Well Manufacturing Corp.*

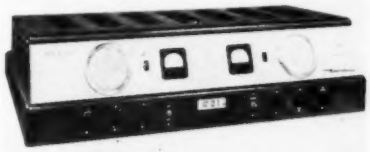


IT'S NEW CHECK IT

36 CHLORAX SPRAY POWDER, chemical weed killer particularly intended for use in locations where weeds present a fire hazard, does not create danger of poisoning to grazing animals under normal conditions of use. Chlorax is designed to kill all types of vegetation. It gives maximum residual effect in the soil to prevent regrowth which makes possible clean, weedfree areas. It is particularly advantageous for use around oil-storage tanks, oil refineries, and other hazardous areas. *Chipman Chemical Co.*

IT'S NEW CHECK IT

37 CENTRAL STATION CONSOLE FOR 2-WAY RADIO SYSTEMS. Designed for two-receiver operation, this deluxe unit also permits two-frequency transmitter operation with complete test-metering facilities, a panel-mounted cyclometer type of clock, volume and squelch controls for each receiver, line-voltage meter, switching facilities to shift either receiver to a handset when it is used with the system, and a panel-mounted transmit switch for testing the transmitters. The unit is $40\frac{3}{4}$ in. long, $10\frac{1}{2}$ in. high, and $20\frac{1}{8}$ in. deep. *Motorola, Inc.*



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PIPE LINES

Humble Starts Work on West Texas Crude Line

HOUSTON.—Work has started on Humble Pipe Line Co.'s 371-mile, 18-in. crude-oil outlet in West Texas. Among its construction features will be yard coating and wrapping of the 193-mile eastern section, and yard double jointing with automatic welding for the 178-mile western section. Both of these methods are important development for large-scale crude-oil pipe-line construction.

Construction was started at the west end of the 178-mile western section contracted by Morrison Construction Co. The 193-mile eastern section has been contracted by Anderson Brothers Corp. The entire line extends between the Kemper station in West Texas to the Satsuma station in the Houston area. Construction is to be supervised for Humble by A. E. Payne, southern division superintendent, and F. D. McMahon, West Texas division superintendent.

Pipe for the western section was scheduled to arrive by rail the middle of December. Pipe for the eastern section will come by water to the Brown shipyard at Houston where it will be yard coated and wrapped by Rosson Richards Co., Inc. Handling at the yard and stringing has been contracted by Joe D. Hughes, Inc. Humble has specified that only smooth bending without wrinkles be used. All pipe is furnished by A. O. Smith Corp.

Pipe protection at the eastern section will consist of coal-tar enamel, glass mat, a second coat of enamel, 15-lb. felt, and kraft paper. At the western end the pipe will only have an enamel coating and a felt wrapper.

By arranging to have yard coating and wrapping done it will be possible to push work in the eastern section so as to avoid some of the delays in the progress of construction which would otherwise occur during rainy weather.

In the western section where conditions are favorable for handling long joints, Morrison will use yard equipment for double jointing 40-ft. joints to make 80-ft. joints by the automatic submerged arc-welding process. Both yard and field welds for the entire project will be inspected by X-ray.

Anderson will start with one spread at the western end of the eastern section and may add another spread to work toward it from Satsuma.

Pipe will be of two wall thicknesses: $\frac{7}{16}$-in. for distances of 5 to 70 miles on the downstream side of the three pump stations; the remainder of the system will have 9/32-in. wall thickness.

The three electric centrifugal pump stations will be at the following locations: southwest of Menard; near Highway 16; and near Highway 77. With three stations in operation the system will have a capacity of 135,000 bbl. daily. Completion has been scheduled for June 1, 1950.

Transcontinental Issues Progress Report on Line

HOUSTON.—Progress on the construction of Transcontinental Gas Pipe Line Corp.'s 1,840-mile gas line to the New York area is outlined in detail in the accompanying table, released by the company here this week.

Officials of the firm said the 1949 construction program is on schedule in spite of the coal and steel strikes. The following table gives the section number, location of the spreads, number of miles, name of contractor, and status as of December 3:

Section (unnumbered), Rio Grande Valley to Eunice, La., 502 miles; contracts not let.

Section 1, Eunice, La., to Mississippi River, 66 miles; Morrison Construction Co., completed.

Section 2, Mississippi River to Bassfield, Miss., 112 miles; Morrison Construction Co., Inc., completed.

Section 3, Bassfield, Miss., to Tombigbee River, Ala., 112 miles; Wunderlich-Griffis Construction Co., 88 miles laid.

Section 4, Tombigbee River, Ala., to Coosa River, Ala., 103 miles; Midwestern Constructors, Inc., completed.

Section 5, Coosa River, Ala., to Newman, Ga., 103 miles; Midwestern Constructors, Inc., 69.32 miles laid.

Section 6, Newman, Ga., to Danielsville, Ga., 108 miles; Williams Brothers Co., 48.80 miles laid.

Section 7, Danielsville, Ga., to Saluda River, S. C., 86 miles; Williams Brothers Co., contract let.

Section 8, Saluda River, S. C., to Catawba River, N. C., 102 miles; R. H. Fulton & Co., contract let.

Section 9, Catawba River, N. C., to N. Carolina-Va. boundary, 100 miles; R. H. Fulton & Co., contract let.

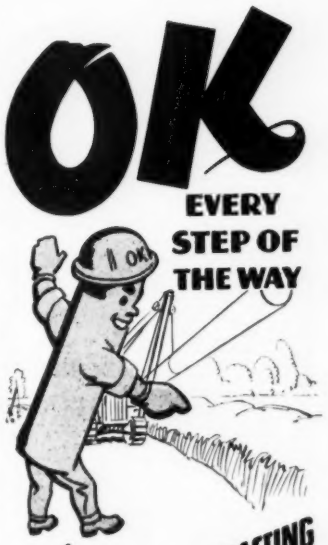
Section 10, North Carolina-Virginia boundary to James River, Va., 86 miles; O. R. Smith Contracting Corp., contract let.

Section 11, James River, Va., to Potomac River., Va., 110 miles; O. R. Smith Contracting Corp., contract let.

Section 12, Potomac River, Va., to Susquehanna River, Pa., 76 miles; Associated Engineers & Contractors, Inc., contract let.

Section 13, Susquehanna, Pa., to Delaware River, 90 miles; Wunderlich & Griffis Construction Co., contract let.

Section 14, Delaware River to Hacken-



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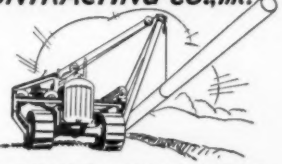

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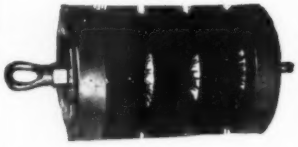

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sack River, N. J., 61 miles; Wunderlich & Griffis Construction Co., contract let.

Section (unnumbered), Hackensack River, N. J., to Hudson River, N. Y., 23 miles; Oklahoma Contracting Co., contract let.

Mid-Valley Completes Mississippi Crossing

MAYERSVILLE, Miss.—Mid-Valley Pipeline Co. completed early this week the mile-long crossing of the Mississippi River at a point near Rolling Fork, Miss. This crossing consists of two 20-in. lines coated with Somastic and an outside coating of concrete. One of the lines at the crossing was laid with an upstream camber and the other with a downstream camber.

The crossing was laid in connection with the construction of the 1,000-mile Mid-Valley crude-oil pipe line which is a joint undertaking of Sun Oil Co. and Standard Oil Co. (Ohio) estimated to cost $56,000,000 to provide capacity for pumping at the rate of 150,000 bbl. daily after the line has been completed in the fall of 1950.

Mid-Valley has already completed crossings at the Ohio, Kentucky, Cumberland, and Red rivers where pipe was pulled across the river from one shore to the other. A different procedure had to be used at the Mississippi River which has a 6-mile-an-hour current under flood conditions.

Magnolia Laying Pegasus Field, West Texas, Outlet

Magnolia Pipe Line Co. will give the Pegasus field of Midland-Upton counties, West Texas, its first pipeline outlet with completion this week of 25 miles of 8-in. line connecting to the company's trunk-line system near Midland. Capacity of the line will be about 25,000 bbl. daily, and the line will be fed by a field gathering system of 4-in. and 6-in., which totals about 6 miles to date.

Capacity of the line indicates that the company expects Pegasus to develop into a large field, possibly a major one. Magnolia Petroleum Co. discovered the field early this year and has substantial acreage holdings within what are expected to be the producing limits. (For previous discussions of this area and its potentialities, see *The Oil and Gas Journal, March 17, 1949, page 207; October 6, 1949, page 361; Nov. 10, 1949, page 397; and Dec. 1, 1949, page 113).*

Additional pipe-line news will be found at the end of the Pipe-Line Construction tables on page 112.

Two joints of 30" pipe welded together to form a length 62' long, shown in the final Bending Stage in the "Cinch" Bender. Note how the pipe was bent continuously through the Welded Joint. This demonstration established firmly, quality on an Economical Basis.

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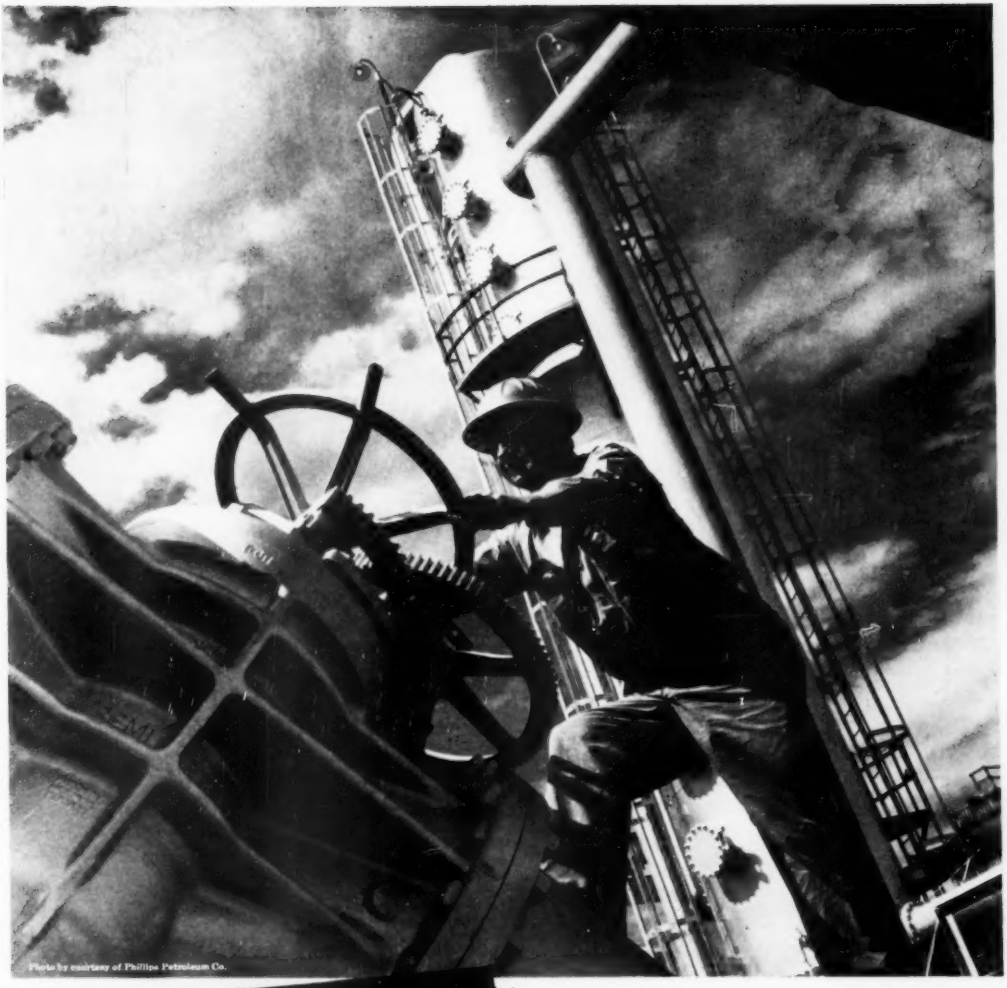

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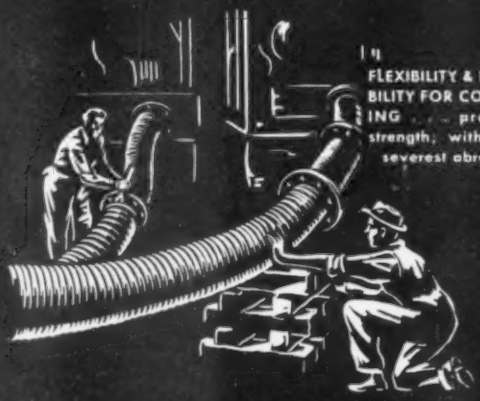

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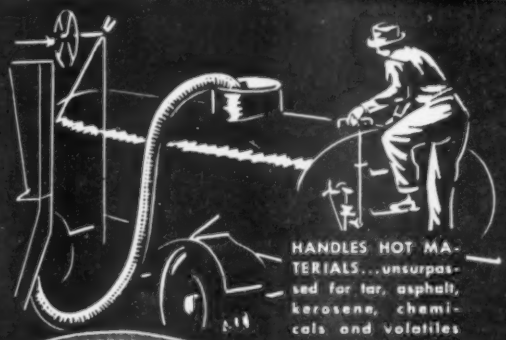

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Pipe-Line Construction

FOLLOWING is a tabulation of pipe-line projects, both domestic and foreign, which are planned or under construction. Included are crude-oil, products, and natural-gas lines. The list was compiled from surveys made by The Oil and Gas Journal.

Crude-Oil Pipe Lines—Domestic

Atlantic Pipe Line Co.—420 miles 10-in., under construction, Crane to Harbor Island, Tex.; Evans & James, contractor; Montgomery Trucking Co., stringing contractor; J. M. Beavers, superintendent. 50 miles 10¾-in. under way, Rockspring-Sonora, Tex.; H. B. Zachry Co., contractor; spread office, Rocksprings; Guy C. Lamon, superintendent.

Humble Pipe Line Co.—375 miles 18-in., planned, West Texas-Satsuma Station to Baytown, Tex.

Mid-Valley Pipe Line Co. (Sun and Ohio).—1,000 miles 20-22-in., planned, Longview, Tex., to Mayersville, Miss.-Covington, Ky., to Lima, Ohio. Contracts let for 857 miles, as follows: Section 2, Haynesville, La., to Mayersville, Miss., Latex Construction Co.; spread office, Farmerville, La.; F. A. Silar, general superintendent; W. A. Briley, spread superintendent; office at Haynesville, La., W. H. Hayes, superintendent; M. L. Thompson, assistant superintendent. 41 miles 12-in., lateral, Delhi to Lake Providence, La.; headquarters, Lake Providence; E. C. Norris, general superintendent; R. E. Thornton, superintendent. Section 3-A, Mayersville to Oakland, Miss., Associated Pipe Line Contractors, Inc.; J. A. Williams and L. H. Gray, spreadmen; Section 3-B, 4-A, Oakland, Miss., to Henderson, Tenn., Eastern Construction Co.; Section 4-B, 5-A, Henderson to Clarksville, Tenn., Eastern Construction Co.; Section 5-B, 6-A, Clarksville, Tenn., to Elizabethtown, Ky.; Britton Construction Co.; Section 6-B, Elizabethtown to Hebron, Ky., H. L. Gentry Construction Co.; Section 7 South, Hebron, Ky., to Eaton, Ohio, Britton Construction Co., spread office, Hamilton, Ohio; spreadman, Fred Peters; Section 7 North, Eaton to Lima, Ohio; Section 8, Magnolia, Ark., to Haynesville, La.

Phillips Pipe Line Co.—54 miles 8-in., under construction, Thrall to Kansas City, Kans.; Morrison-Wilson-Anderson Brothers, contractors.

Portland Pipe Line Co., Montreal Pipe Line Co., Ltd.—234 miles 18-in., planned, Portland, Me., to Montreal, Que., Canada, contracted as follows: Oklahoma Contracting Co., 85 miles in Section 1 at southern end; Associated Pipeline Contractors, Inc., Section 2, 81 miles; and Fred Mannix & Co., Ltd., 68 miles, Section 3, in Canada.

Richfield Oil Corp.—40 miles 10-in. Cuyama Valley-Newhall, Calif., planned; Bechtel Corp., contractor; central plant, Watson, Calif., 60 miles 14-in. applying field joints, Newhall-Wilmington, Calif.; under way; Bechtel Corp., contractor.

Shell Pipe Line Corp.—190 miles 10¾-in., take up, Cushing, Okla., to Emmitt, Mo.; under way; Trojan Construction Co., Inc., contractor; spread office at Mount Vernon, Mo.; Maurice W. Crawford, spreadman.

160 miles 10¾-in., Cushing, Okla., to Elk City, Okla.; under construction; Trojan Construction Co., Inc., contractor; spread office, El Reno, Okla.; Swede Tillotson, spreadman.

Skelly Oil Co.—35 miles 8-in., Valley Center to El Dorado, Kans.; under construction; Bishop & Lock Construction Co., contractor; spread office, Wichita, Kans.; Barry Hall, spreadman.

40 miles 8-in., reclaim, Burrton to El Dorado, Kans.

Sun Pipe Line Co.—61 miles 4-10-in., authorized, Seabreeze to Sun Station, Tex.

Texas-Empire Pipe Line Co.—40 miles 16-in., authorized, Wilmington, Ill., to East Chicago, Ind.

Texas-New Mexico Pipe Line Co.—61 miles 10-in., authorized, Colorado City to Borden County, Texas. Contracted as follows: 40 miles 10¾-in., Borden County to Colorado City pump station, Scurry County, Carl H. Dunn; 16.08 miles 6⅝-in., and 5.41 miles 4½-in., Borden and Howard counties, Wright Construction Co.

Products Pipe Lines—Domestic

Buckeye Pipe Line Co.—140 miles 8-in. Speedway City, Ind., to Lima, Ohio; under construction; H. L. Gentry Construction Co. contractor; spread office, St. Marys, Ohio Frank Morris, spreadman.

Great Lakes Pipe Line Co.—52 miles 15-in., Albert Lea to Fairbault, Minn.; under construction; Sheehan Pipe Line Construction Co., contractor; spread office, Albert Lea, Minn.; C. W. Henderson, spreadman. O. R. Burden Construction Co., 65 miles north from Des Moines; A. C. Holder Construction Co., 72 miles to Iowa-Minnesota state line; Williams Brothers Corp., 20 miles, Mississippi River crossing and line to terminal and station. Construction on this Great Lakes project has been delayed by steel strike.

165 miles 12-in., Irvington, Neb., to Sioux Falls, S. D., planned.

Phillips Petroleum Co. and Shamrock Oil & Gas Co.—152 miles 6-in., planned, La Junta to Denver, Colo.

Salt Lake Pipe Line Co.—320 miles 8-in under way, Salt Lake City to Boise, Idaho, Smith Contracting Co., spread office, Ogden; C. C. Craig, spreadman; Oklahoma Contracting Co., Grafe-Callahan Construction Co., contractors.

242 miles, 6-8-in., Boise, Idaho-Pasco Wash., planned. 120 miles 8-in., Salt Lake refinery toward Boise, Idaho; railroad plant at Ogden, Utah; Leon Garrott, superintendent; Bechtel Corp., contractor.

Sinclair Refining Co.—130 miles, all sizes, take up and recondition, Bristow, Okla., area; Atlas Construction Co., Inc., contractor; Frank M. Mahan, in charge.

Standard Oil Co. (Ohio)—38 miles 8-in., under way, Toledo to Fosteria, Ohio; Britton Construction Co., contractor; Fred Peters, superintendent; spread office, Woodville, Ohio.

Natural-Gas Pipe Lines—Domestic

Alabama-Tennessee Natural Gas Co.—80 miles 10-in., planned, from Tennessee Gas Transmission Co. line near Selmer, Tenn. to Tuscombia, Ala.; Lehman-Hoge & Scott contractor.

61 miles 6-8-in., planned, Huntsville to Tuscombia, Ala.

80 miles 11-in., under construction, Selmer, Tenn., to Muscle Shoals, Ala.; Lehman-Hoge & Scott, contractor.

36 miles 6-8-in., authorized, Muscle Shoals to Decatur, Ala.

Arkansas Louisiana Gas Co.—162 miles 20-in., under construction, Waskom, Tex. and Perla, Ark.; Anderson Brothers Co Latex Construction Co., contractors. (91 miles 20-in. contracted to Latex, 60 miles completed. Spread office, Magnolia, Ark.; H. L. Leake, spreadman.)

70 miles 20-in., under construction, Waskom, Tex., to Magnolia, Ark.; Anderson Brothers, contractor.

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Line Co.)—1,330 miles, planned, Alabama Florida-Georgia-South Carolina.

Central Hudson Gas & Electric Corp.—40 miles, planned, Tuxedo, N. Y., station. Home Gas Co. line now under construction, to Poughkeepsie, N. Y.

Central Kentucky Natural Gas Co.—38 miles 12-20-in., planned, Kentucky loops.

Chicago District Pipe Line Co.—41 miles 24-in., planned, Joliet, Ill., to Chicago.

City of Indianapolis, Ind., Inc.—58 miles 16-in., proposed, Indianapolis to Texas Eastern Transmission Corp.'s system.

Cities Service Gas Co.—42.6 miles planned, in Kansas. Seeking approval to abandon 127.3 miles.

Coast Counties Gas & Electric Co.—40 miles 3-4-8-in., planned, coast and valley region, California.

Coastal Pipe Line Co.—1,000 miles, planned, Texas to Norfolk, Va.

Colorado Interstate Gas Co.—38 miles 20-in., planned, Texas Panhandle and Hugoton field, Kansas, to Denver, looping. Cheek Construction Co., contractor; Troy Cheek, superintendent.

Colorado-Wyoming Gas Co.—41 miles, planned, Greeley, LaSalle, and Windsor, Colo., areas.

Commonwealth Natural Gas Corp.—837 miles 20-in., planned, West Bend, Ky., to Norfolk, Va.

200 miles, planned, Green County, Virginia, to Norfolk.

Consolidated Gas Utilities Corp.—41 miles 12-in., planned, Enid-Blackwell and Marlow-Cement, Okla.

Egyptian Natural Gas Co.—80 miles 6-8-in planned, Norris City to Salem-Centralia, Ill., areas.

East Tennessee Natural Gas Co.—398 miles 3-16-in., planned, Nashville-Chattanooga-Knoxville, Tenn., and lateral lines.

172 miles 22-in., under construction, Greenbrier, Tenn., to Oak Ridge; Oman-Fulton & Brodie, contractor. Office, spread 1, Cookeville, Tenn.; H. P. Crawford, spreadman. Spread 2 office, Crossville, Tenn.; A. A. Carrigan, spreadman; spread 3 office, Harriman, Tenn., M. L. Boyd, spreadman; J. T. Brodie, general superintendent.

185 miles, 16-in., Lobelville-Chattanooga, Tenn., contracted by Walters & Saigh Con. Co. for construction in 1950; 120 miles, 12-in., Chattanooga - Knoxville, Tenn., contracted by Walters & Saigh Con. Co. for construction in 1950, 100 miles of laterals to be laid in 1950. Construction 150 miles, 16-in., Knoxville-Bristol, Tenn., under consideration.

El Paso Natural Gas Co.—91.3 miles planned, Almagordo, N. M., to Willcox, Ariz.

105 miles 24-in., planned, Upton County, Texas-Jal, N. M., all work by company crews.

102 miles 26-in., planned, Crossover South to Topock, Ariz.

450 miles 30-in., under construction, Eunice, N. M.-Blythe, Calif., looping.

451 miles, 24-in., planned, Farmington, N. M. (San Juan basin)-Topock, Ariz.

270 miles, planned, laterals for San Juan project.

Gulf Oil Corp.—40 miles 3-24-in., under construction, Eunice, N. M., gathering system and gasoline plant; Younger Construction Co., contractor.

Gulfcoast Northern Gas Co.—Gulf Coast area, proposed, to Illinois.

Home Gas Co.—70 miles, planned, Orange, Sullivan-Rockland counties, New York-Cattaragus County, New York, areas.

Jersey Central Power & Light Co.—39.4 miles 10-in., planned, New Jersey to Coast system, Texas Eastern Transmission Co.'s Big Inch.

Kansas-Nebraska Natural Gas Co., Inc.—301 miles, authorized. Kansas-Nebraska area, including the following contracted to Rumsey Brothers Pipe Line Construction Co.: 10 miles 12¾-in., replacing 8-in. in Alma-Holdredge, Nebr., line; 7 miles 8⅝-in., and 44 miles of 6⅝-in., Elm Creek to Loup City, Nebr.; 18 miles 4½-in., and 18 miles 3½-in., Litchfield to Broken Bow, Nebr.; and 10 miles 6⅝-in., Red Cloud to Guide Rock, Nebr.

Magnolia Petroleum Co.—70 miles, all sizes, gathering system for gasoline plant; Pipe Line Service Co., contractor; field office, Healdton, Okla.; G. Pack, spreadman.

35 miles 4-5-in., under construction; gathering system for gasoline plant; Pipeline Service Co., contractor; spread office, Lindsay, Okla.; Red Dowdson, spreadman.

McCarty Oil & Gas Co.—100 miles 12-13-16-20-in., under construction, Jackson Pasture to Orange, Tex.; Anderson Brothers, contractors.

Michigan-Wisconsin Gas Co.—100 miles 10-in., under construction in Wisconsin; Anderson Brothers, contractor.

59 miles 4-3-2-in., under construction, Fort Madison to Mount Pleasant, Iowa; Rumsey Brothers Construction Co., contractor.

97 miles 22-10-in., under construction, Racine to Stoughton, Wis.; Anderson Brothers, contractor.

196 miles laterals, Milwaukee-Fond du Lac, Sheboygan, and Green Bay, Wis., under construction; C. C. Griffis Construction Co., contractor; Paul Means, superintendent for Lake Del Mort crossing.

Mississippi River Fuel Corp.—10 miles 20-24-in., under construction; Sheehan Pipe Line Construction Co., contractor; spread office, East St. Louis, Ill.; C. M. Brown, spreadman.

Montana-Dakota Utilities Co. and Montana-Wyoming Gas Pipe Line Co.—340 miles 12¾-in., planned, Worland, Wyo., to Cabin Creek, Mont.

Montana-Dakota Utilities Co.—30 miles 4-in., authorized, Saco and Baker, Mont.

60 miles 3-12-in., authorized, field lines for 1948 construction.

Montana Power Co.—83 miles 12¾-in., planned, Butte to Bozeman, Mont.

Northeastern Gas Transmission Co.—511 miles, up to 20-in., planned, in New England area.

Northern Natural Gas Co.—41 miles 20-in., under construction, Southwest from

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Garden City, Kans.; R. H. Fulton & Co., contractor.

Northern Natural Gas Co.—20 miles 6 to 20-in., near Skellytown, Tex.; under way; R. H. Fulton & Co., contractor; spread office, Pampa, Tex., Jerry Nash, spreadman.

8.5 miles 8-in., near Beatrice, Neb., planned; R. H. Fulton & Co., contractor.

62 miles 20-24-in., under way, Garden City, Panhandle fields; R. H. Fulton & Co., contractor; spread office and spreadmen: Garden City, F. A. Patterson; Beatrice, Neb.; Dave Wagner.

88 miles, all sizes, planned, Kansas-Nebraska looping.

270 miles 26-in., planned, additions to system north of Kansas.

Northwest Natural Gas Co.—750 miles planned; Washington, Oregon, and Idaho.

Ohio Fuel & Gas Co.—48 miles 20-in., under construction, Mount Gilead to Treat Station; Pavonia Station to Washington, C. H., Ohio; Mahoney Contracting Co., contractor.

85 miles, planned, Central Ohio replacement.

Pacific Gas & Electric Co.—47 miles 8-in., authorized, Salinas to Kilig City, Calif.

Pacific Gas & Electric Co.—506 miles 34-in., under construction, Topock, Ariz.,-Milpitas, Calif.; Bechtel-Price-Conyes, contractor; spread office, Coyote, Calif.; R. L. Bowman, spreadman.

Panhandle Eastern Pipe Line Co.—356 miles 26-in., authorized, looping in Texas, Oklahoma, Kansas, Missouri, Illinois, Indiana, Ohio, and Michigan.

252 miles 26-in., authorized, loops from Texas and Michigan.

Peoples Gas Light & Coke Co.—1,000 miles 30-in., planned, Houston to Joliet, Ill.

Phillips Petroleum Co.—25 miles gathering system in West Edmond, Okla., field, under construction; Vaughn & Taylor Construction Co., Inc., contractor; spread office, Edmond, Okla.

Piedmont Natural Gas Corp.—1,290 miles 20-in., planned, upper Gulf Coast area to Danville, Va.

San Diego Gas & Electric Co.—53 miles 16-in., planned, San Diego County, California.

San Diego Gas & Electric Co. (Southern Counties Gas Co.)—85 miles, authorized, San Diego-Riverside-Moreno, Calif.

Southern Counties Gas Co.—88 miles 30-in., planned, Whitewater to Rosemead, Calif.

35 miles 16-in., planned, Moreno to San Diego County, California.

South Jersey Gas Co.—77 miles, planned, Camden to Atlantic City.

Southern Natural Gas Co.—138 miles 20-22-in., planned, Chattanooga, Tenn., to Lexington, Miss.

375 miles 24-in., planned, Gwinville, Miss., to Atlanta.

225 miles 16-in., planned, Colfax, Ga., extension.

61 miles 24-in., under construction; Eastern Alabama loop; Latex Construction Co., contractor.

110 miles 11-in., considered; extension.

32 miles 13-in., under construction, branch line loop in Alabama; Ford, Bacon & Davis Construction Co., contractor.

314 miles 18-in., planned; extension.

171 miles 16-in., planned; extension.

118 miles 13-in., planned; extension.

Southern Union Gas Co.—78 miles 8-10-14-in., planned, New Mexico loops and laterals.

Tennessee Gas Transmission Co.—155 miles 30-in., authorized, central Louisiana to Northern Tennessee, looping.

65 miles 16-in., planned, Ohio-Pittsburgh spur.

790 miles 20-26-in., planned, Burnaugh, Ky., to Boston, including 400-mile line to Buffalo.

992 miles 30-in., planned, first 150 miles of loops to be laid at Monroe, La., Greenville, Miss., Midland and Portland, Tenn.

47 miles 30-in., authorized, Louisiana.

45 miles 30-in., authorized, Tennessee.

Texas-Eastern Transmission Corp.—1,400 miles planned, Texas to Pittsburgh loops.

Texas Eastern Transmission Corp.—40 miles 20-in., Lisbon to Lucky, La., under construction; Associated Pipe Line Contractors, Inc., contractor; spread office, Kans., area; R. H. Fulton & Co., contractor; Ed Veach, spreadman.

58 miles 4-24-in., authorized, Hugoton and Arcadia, La.; J. A. Williamson, spreadman.

800 miles planned, New York City to New England.

69 miles 20-in., planned, looping in Beaumont, Tex., and Castor to Lisbon, La.

Texas Gas Transmission Corp.—15,000 ft. 16-in., Mississippi River crossing, 4-16-in. high-pressure gas lines near Greenville, Miss.; under construction; N. A. Saigh Co., Inc., contractor; spread office, Greenville, Miss.; Carl Doyle, superintendent.

106 miles 20-in., Carthage, Tex., to near Lisbon, La. (Sharon); under construction; N. A. Saigh Co., Inc., contractor; Carthage, Tex.; Bob Floyd, representative. Construction subcontracted: (1) Fowler Brothers, 43 miles from Carthage to Red River, field office at Carthage, M. C. Johnson, spreadman; (2) 63 miles to Sharon sta., Oklahoma Contracting Co. (J. R. Horrigan) field office at Minden, La., Ed Flanagan, spreadman.

Midwestern Constructors, Inc., 80 miles, 26-in. in Jefferson County, Indiana, and Warren County, Ohio; R. Carl Stanley, superintendent in charge; field offices, Hamilton and Middleton, Ohio; M. T. Wilhite, spreadman; multiple 20-in. river crossing across Green River, near Slaughters, Ky., Leroy Jackson, superintendent in charge; field office, Rumsey, Ky.

32 miles, planned, Madisonville to Evansville, Ind.

Texas Illinois Natural Gas Pipeline Co.—1,000 miles 30-in., planned, Houston to Joliet, Ill.

Transcontinental Gas Pipe Line Co.—600 miles 30-in., under construction, Texas to New York; Morrison Brothers Construction Co., Wunderlich & Griffis Construction Co., field office, Laurel, Miss.; G. H. Collier, spreadman; Midwestern Constructors, Inc., 216 miles 30-in. from Demopolis, Ala., to Newman, Ga., work directed by M. T. (Bill) Wilhite; field offices at Alexander City, Ala., and Roanoke, Ala. Williams Brothers Corp., contractor for the Georgia section.

1,840 miles, under construction, main line 70 miles 20-in., 460 miles 26-in., 1,210 miles 30-in., Rio Grande Valley, Texas, to New York City.

36 miles, planned, New Jersey to New York-Connecticut line.

380 miles 8-16-in., planned, laterals to gas field.

216 miles 30-in., under construction, Demopolis, Ala., to Newnan, Ga.; Midwestern Construction, Inc., contractor; field office at Clanton, Ala.; M. T. Wilhite in charge; spread office, Alexander City, Ala.; A. T. Tolbert, spreadman.

Trunkline Gas Supply Co.—1,400 miles 10, 18, 20, and 24-in., planned; includes 740-mile 26-in. main line from Longville, La., to Tuscola compressor station on Panhandle Eastern Pipe Line Co., and 700 miles of gathering system.

United Fuel Gas Co.—32 miles 20-in., authorized, Roane, Calhoun, and Wetzel counties, West Virginia.

United Gas Pipe Line Co.—80 miles 2-4-6-in., under construction, laterals, North Mississippi; L. E. Farley Construction Co., contractor.

90 miles 16-in., planned, West Bay field to New Orleans.

105.6 miles 20-in., planned, loop line paralleling Carthage, Tex.-Sterlington, La., and extending on to near Monroe, La.; O. C. Whitaker Co., contractor for 40-mile spread; office and spreadman, Monroe, La., Merle Tatum; Rosson-Richards Co., coating contractor.

26 miles in Louisiana connecting with East Texas system, planned.

United Natural Gas Co.—29 miles 12-in., authorized, laterals, Elk County, Pennsylvania.

Virginia Natural Gas Co.—153 miles planned, Buckingham to Richmond and Portsmouth, Va.

Washington Light Co.—30 miles 6-12-in., under construction, Washington, Pa.; Britton Contracting Co., contractor.

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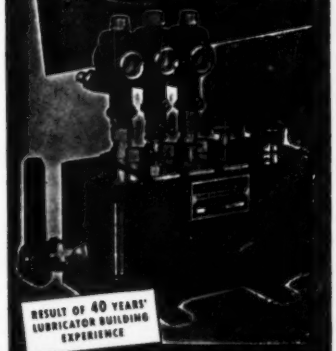

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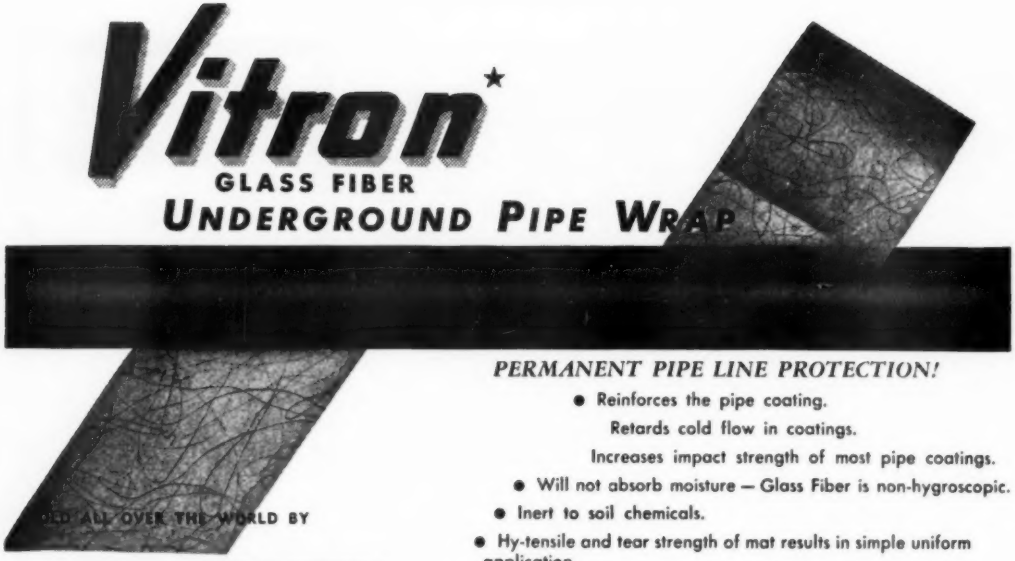

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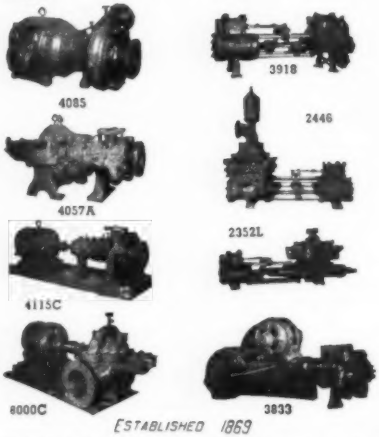

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Crude-Oil Pipe Lines—Foreign

Corporacion de Fomento de Chile.—45 miles 8-in., planned, Cerro Manatiales (Springhill) to Caleta Clarencia (on Bahia Gente Grande), contracted by Technint Pipe Line Division, Tecnica International, S.A.

Interprovincial Pipe Line Co. (Imperial)—1,150 miles 16-20-in., planned, Edmonton area, to Superior, Wis.; contracted as follows: 450 miles 20-in., Edmonton-Regina, Canadian-Bechtel, Ltd., associated with Fred Mannix Co., Calgary, Alta.; 340 miles 16-in., Regina to Gretna, Man., Williams Brothers Corp.; 360 miles 18-in., Minnesota and Wisconsin, Anderson Brothers Corp.

Iraq Petroleum Co., Ltd.—620 miles, 16-in. Kirkuk-Haifa, Palestine, shut down.

556 miles 30-32-in., planned, Kirkuk, Iraq-Banias, Lakatia.

Kuwait Oil Co. (Gulf and Anglo-Iranian) 1,100 miles 30-in., considered, Kuwait, Arabia, to Levantine Port.

600 miles 4-30-in., under construction. Bechtel-Kuwait, Arabia.

Middle East Pipe Line Co.—800 miles 34-36-in., planned, Iran-Levantine Port.

Montreal Pipe Line Co., Ltd. (See Portland Pipe Co. item in domestic crude oil list.

Petroleos Mexicanos.—280 miles 12¾-in. authorized, Poza Rica to Salamanca, Mexico.

140 miles 10¾-in., authorized, Minatitlan to Salina Cruz.

Santos Jundial Railroad—30 miles 18-in., planned, Santos to Sao Paulo, Brazil.

Trans-Arabian Pipe Line Co.—1,067 miles 30-31-in., under construction, Abqaiq, Saudi Arabia, to Sidon, Lebanon; International Bechtel, Inc., Williams Brothers Corp., Graver Tank & Mfg. Co., and Chicago Bridge & Iron Co., contractors.

Yacimientos Petroliferos Fiscales de Argentina.—25 miles, under way, Tupungato-Lujan de Cuyo.

409 miles, under way, Plaza Huincul-Bahia Blanca.

10 miles, under way, Lujan to Cuyo-Agrelo.

Products Pipe Lines—Foreign

Petroleos Mexicanos.—160 miles 10¾-in., authorized, Minatitlan to Salina Cruz, Mexico.

Cia. des Pipe Lines Petrolliers Francias.—150 miles 10-in., planned, Le Havre to Paris, France.

Colombian Government. — 342 miles, planned, Puerto Berrio to La Dorada, 92 miles; La Dorada to Bogota, 110 miles; La Dorada to Cartago, 140 miles.

Ministry of Petroleum of Colombia and Antioqua R.R.—107 miles, planned, Puerto Berrio to Madellin, Colombia.

Northern Pipe Line, Ltd.—300 miles 10-in., planned, Montreal to Toronto, Canada.

Santos Jundial Railroad.—40 miles 10-in., planned, Santos to Sao Paulo to Campinas, Brazil.

Svenska Enterprenad Aktiebolget.—220 miles, planned, Uddevalla to Vasteras, Sweden.

Natural-Gas Pipe Lines—Foreign

Direccion General del Gas del Estado.—310 miles, under way, Plaza Huincul to Neuquen, Argentina, to the vicinity of General Conesa, Argentina.

62 miles, Comodoro Rivadavia to Caleto Olivia, under way.

Northwest Natural Gas Co.—950 miles 24-in., planned, Alberta fields to Vancouver, B. C., Seattle, Wash., and Portland, Ore.

Petroleos Mexicanos.—205 miles 16-in., considered, Monterrey to Torreon, Mexico.

260 miles 20-in., considered, Monterrey-Tampico-Poza Rica area, Mexico.

Petroleos Mexicanos, Mexican Gas Co., and Industrial Gas Co.—600 miles, planned, Reynosa, Tamaulipas to Mexico City, D. F., Mexico.

Westcoast Transmission Co., Ltd.—1,400 miles 30-in., planned, North Alberta, Vancouver, B. C., and northern California.

Western Pipe Lines.—710 miles, 22-24-in., planned, Alberta fields, Saskatoon, Alta., to Winnipeg, Man., Canada.

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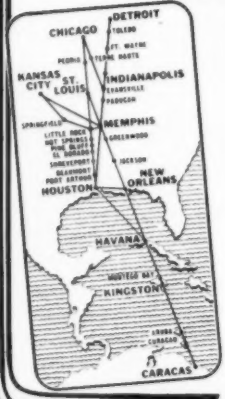

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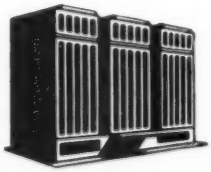

Trunkline Given More Time To Finance New Gas Project

Federal Power Commission has extended from November 29 until next June 1 the deadline for Trunkline Gas Supply Co. to submit a "definite and firm plan of financing" for the natural-gas pipe-line project authorized last April 29 by FPC.

The deadline originally was set for 120 days after the issuance of the April 29 order, but was later extended by the commission to November 29.

Trunkline's original construction program called for a 711-mile pipe line from Edge, Tex., to Palmyra, Neb., for the purpose of supplying 250,000,000 cu. ft. of natural gas per day to Northern Natural Gas Co. Trunkline stated, however, it was unable to make a contract with Northern.

However, at the time Trunkline asked FPC to extend the time for filing the financing plan, it also asked an amendment of the April 29 order to permit the construction of a 740-mile Louisiana-to-Illinois pipe line in lieu of the Texas-Nebraska line. The company is now proposing to deliver the 250,000,000 cu. ft. of gas to Panhandle Eastern Pipeline Co., with which it has contracted for the contemplated sale.

Estimated over-all cost of the project as now proposed is approximately $85,000,000.

Firms Seek to Build Gas Lines to Serve Roanoke, Va.

The Federal Power Commission scheduled a consolidated hearing to begin December 14 in Washington, D. C., on applications of Virginia Gas Transmission Corp. and Roanoke Pipe Line Co. for authorization to construct pipe-line facilities which would carry natural gas to the Roanoke, Va., area.

Roanoke Pipe Line Co., Roanoke, is proposing to construct a 30-mile line extending from a point of connection with Virginia Gas Transmission's main line near Gala, Va., to Roanoke Gas Co.'s existing distribution facilities in Roanoke. Estimated over-all cost of facilities is $586,000.

Virginia Gas Transmission, Charleston, W. Va., is seeking authorization to construct and operate a metering and regulating station at the Gala delivery point. The company estimates cost of the facilities at $18,000.

Roanoke Gas Co. last June requested an FPC order directing Virginia Gas to connect its pipe-line facilities with those of the Roanoke company for the purpose of delivering gas for distribution in Roanoke, Salem, and Vinton, Va. However, this request was later withdrawn after Roanoke Gas notified FPC that Virginia Gas Transmission had offered a proposed form of contract agreeing to supply Roanoke's needs for the Gala connection.

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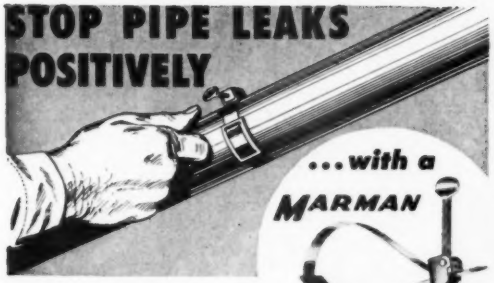

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Glasscock Chosen Head Of Shreveport Drillers

Charles W. Glasscock, Glasscock Drilling Co., has been elected chairman of the reactivated Shreveport chapter of the American Association of Oilwell Drilling Contractors. N. H. Wheless, Jr., Wheless Drilling Co., is vice chairman; B. M. Nowery, Nowery Drilling Co., secretary; and W. A. Brown, J. I. Roberts Drilling Co., treasurer.

The Dallas-Fort Worth chapter has chosen F. W. Brigance, Rowan Drilling Co., Chairman; William L. McClusky, M. J. Delaney Co., vice chairman; and Kye Trout, of the general association staff, secretary.

Increase in Active Rigs Sets New Peak for Year

The number of rotary rigs operating in the United States and western Canada during the week ended December 5 (latest report) reached a new high for the year. The number reported totalled 2,253, an increase of 26 over that of the previous week, and 14 over the previous peak reached during the week ended November 21, 2 weeks ago. Largest gain was in the West Texas and New Mexico area. Decreases were reported in the Gulf Coast, Rocky Mountain and Pacific Coast areas.

ROTARY RIGS IN OPERATION*
(United States and Western Canada)

	Week ended	Change week ended	
Area—	12-5-49	11-28-49	12-6-48
Gulf Coast	517	—24	—138
W. Tex.-N. M.	699	+32	+ 90
Ark.-N. La.-E. Tex.	161	+ 2	— 21
Oklahoma	257	+11	— 29
Kansas	144	+13	+ 3
Illinois-Eastern	151	+ 6	0
Rocky Mountains	96	—11	— 51
Pacific Coast	141	— 5	— 50
Total U. S.	2,166	+24	—196
Western Canada	87	+ 2	+ 13
Total	2,253	+26	—183

*Courtesy Hughes Tool Co.

Ray Holbert, Winnsboro, Tex., is drilling for R. J. Caraway and A. V. Erwin at 1 Mullinax, a Paluxy sand wildcat located 2 miles southeast of Winnsboro, Wood County, East Texas.

Pabco Drilling Co., Wichita, has been awarded contracts for two tests to be drilled for National Associated Petroleum Co. in Brown County, in the extreme northeastern part of

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HOUSTON

Ready to "take-off" for the Kuwait-Sudia Arabian Neutral Zone, where they will spend the next 2 years, members of the drilling crews of Brown Drilling Co. of Panama, Inc., foreign affiliate of Brown Drilling Co., Long Beach, Calif., are shown by the side of their airplane at Burbank airport. Ned Brown (standing at left of center with hands in pockets), president of Brown Drilling Co., was on hand to bid them farewell. Comprising the group making the trip are: Harry G. Bovie and Allen Dysart, drilling foreman; Newell Hunnicutt, Oscar Loveless, William Parry, and Alvin A. Wallace, drillers; R. E. Fuedge, Frank R. Kink, Lowell O. Ostlind, and Durward Ryon, derrickmen; J. Benningfield, Preston Hale, V. D. Hylton, B. D. McLain, Russell Morris, A. H. Rice, E. E. Richerson, Orville Rinker, E. Sauer, G. W. Stark, John Ward, and F. Willoughby, rotary helpers; L. Shears, truck driver; Harry Hill, mechanic; Kenneth Hayes, crane operator; and Orville Reich, mechanic

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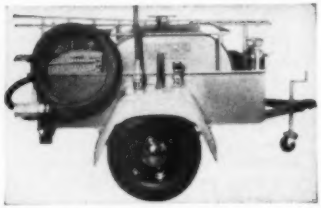

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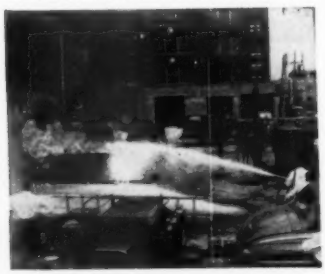

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Kansas. One, 1 Rottinghaus, in 10-4-16e, is 3 miles south of Powhattan. The other, 1 Gerogeson, in 11-3-16e, is 3 miles northeast of the town.

George Moore is the contractor on a wildcat test being started by T. C. Liddell and P. E. Clawson in El Paso County, Texas. The test, projected to 3,000 ft., is 1 Henderson Davis Ranch, Section 21-Block 7, PSL Survey.

Hollandsworth Drilling Co., Longview, Tex., is starting a wildcat test in the William Fisher Survey, 5 miles southeast of Pine Mills in Wood County, East Texas. Hollandsworth Oil Co., an affiliate, is the operator.

Tex-Mex Drilling Co., Longview, Tex., has the contract for a projected 8,600-ft. test to be drilled for Bert Fields at 1 Thigpen-Herold, in 23-16n-16w, 7 miles south of Greenwood, in Caddo Parish, Louisiana.

Longhorn Drilling Corp., Three Rivers, Tex., has the contract to drill Henderson Coquat and O. R. Mitchell 1 W. H. Henry, a wildcat in Farm Lot 2,752, Block 52, Charles F. Simmons, Live Oak County, South Texas. Contract is for 8,000 ft. It also is starting a 6,500-ft. contract in LaSalle County, Southwest Texas, for Henderson Coquat and Amerada Petroleum Corp. at 1 St. Louis Union Trust Co., Section 39, BS&R Survey, 22 miles east of Encinal. Clem Nolan is toolpusher.

Mountain States Drilling Co., Cody, Wyo., has been awarded a contract by Carter Oil Co. for drilling 1 Blanchard, a wildcat test located in 11-6n-55w, 15 miles north of Fort Morgan, Morgan County, Colorado.

Big Chief Drilling Co., Oklahoma City, has started another well in the LaGrange field, Adams County, Mississippi, for Cities Service Oil Co. This latest well is 7 Ayers, in 82-7n-2s.

J. C. Mann, Jr., is the contractor for J. J. Lynn on a 4,200-ft. rotary test being started in Lot 17, Block 5, Clark & Plumb subdivision, 5 miles southeast of Archer City, in Archer County, North Texas.

Canuck Drilling Co. is moving in tools for a Devonian wildcat test to be drilled for Time Oils, Ltd., at 1 Brighbank, 14 miles west of the Golden Spike field, southwest of Edmonton, Alta., Canada. Location is in LSD 4, 23-51n-2w5.

Woffard Drilling Co., Tulsa, has moved in rig for a test to be drilled for Kiska Oil Co. at 1 Hughes, in 28-8n-10e, Hughes County, Oklahoma. Location is 1½ miles from nearest production, the Southeast Yeager pool to the northwest, and the Greasy Creek district to the east.

L. B. Jackson, Tulsa, is the contractor on a second test being started by The Texas Co. on the latter's large block, located about 8 miles west of Meeker, Lincoln County, Oklahoma. This test, 1 Frost, in 18-12n-3e, is about 2 miles southwest of the first test, 1 Watson, recently completed as a small well, but later abandoned. Objective is the Bartlesville sand around 4,800 ft.

McChesney Drilling Co. is the contractor for Glendale Oil Co. on a new Tensleep test getting under way in the South Lake Haltic area, Albany County, Wyoming. Location is for 1 Embree, 25-14n-77w.

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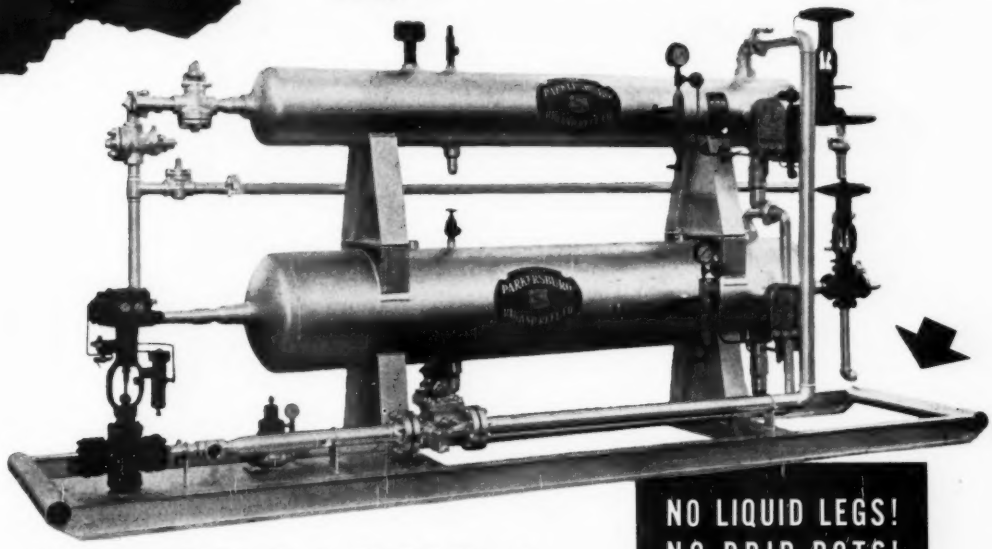

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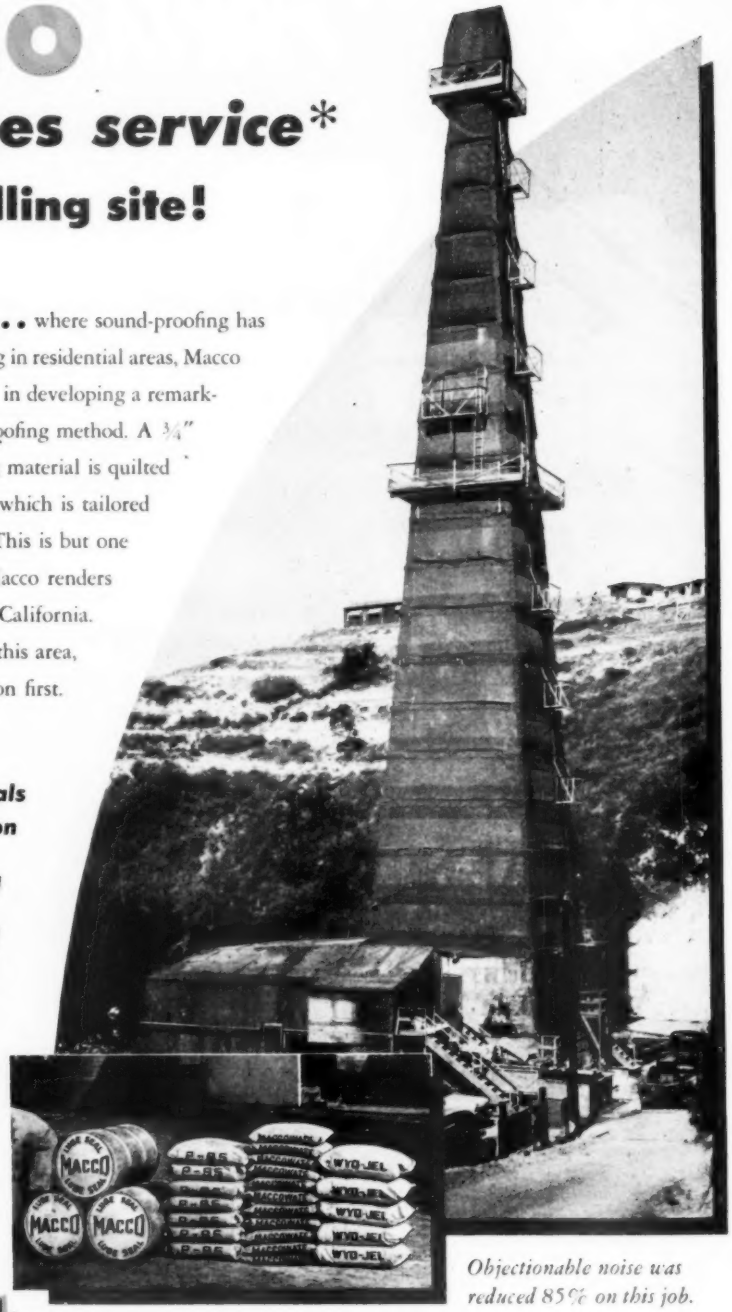

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NATURAL GAS

Eastern Natural Proposes Gas Line to New England

Eastern Natural Gas Corp. has applied to Federal Power Commission for permit to construct a natural-gas pipe-line project, at a cost of $28,000,000, which would extend from near Phoenixville, Pa., across New Jersey, New York, Connecticut, and Rhode Island, to an eastern terminus near Boston. The 292-mile main-transmission line would have an initial capacity of approximately 200,000,000 cu. ft. per day.

The installation would be designed so that capacity could be increased to 275,000,000 cu. ft. daily, and would include about 200 miles of sales lateral lines to serve communities along the route. The proposed line would be 24 in. in diameter.

The newly organized firm, formed for the purpose of constructing the line, proposes to sell natural gas at wholesale to public utilities or municipalities operating distribution systems in communities along the route.

A number of large New England cities would be served by the line, including Boston, New Haven, Hartford, Springfield, Mass., and Providence.

FPC Orders Service Rules For Panhandle Eastern

An interim order setting up emergency-service rules governing deliveries of natural gas by Panhandle Eastern Pipe Line Co. which will provide for an "orderly curtailment" of service when demands of customers exceed capacity of the company's system during the 1949-50 heating season, has been issued by Federal Power Commission. This is the fourth heating season for which service rules are to be in effect on Panhandle's system.

FPC said the rules provide maximum protection to domestic consumers, are effective as of December 2, and will remain in force until May 1, 1950. Customers in Texas, Kansas, Missouri, Illinois, Indiana, Ohio, and Michigan are affected by the orders.

Panhandle's estimated system capacity is 500,000,000 cu. ft. daily, and FPC said this will be approximately 50,000,000 cu. ft. short of its customers' estimated peak day firm-service requirements during the current winter. Also, in addition there is an interruptible service requirement on the system of approximately 78,000,000 cu. ft., FPC stated.

Last winter's calculated daily requirements of customers at zero degree is the starting point for the curtailment plan adopted by FPC, with adjustments to reflect the growth in nonheating domestic and commercial consumption. To the total reached (516,867,000 cu. ft.) the commission's plan then effects the necessary curtailment of 16,867,000 cu. ft. by a uniform 5.847 per cent related to the firm large industrial load of 288,468,000 cu. ft. On this basis, FPC computed maximum allowable volume of gas for each of Panhandle's customers out of the 500,0000,000 cu. ft. capacity of the Panhandle system.

Thus by its action, FPC rejected the firm's proposed curtailment plan, which FPC described as "unjust, unreasonable, unduly discriminatory, and preferential."

United Seeking to Build 12-Mile Natural-Gas Line

United Fuel Gas Co., W. Va., is seeking authorization from Federal Power Commission to construct a total of 12 miles of pipe line for transportation of natural gas to two underground - storage pools in West Virginia.

Included is a request for FPC to approve changes in the company's existing facilities, including transfer of a gas engine-driven compressor unit from one station to another, and changes in operation of compressor units at one of the stations. Estimated cost of the over-all project is $1,326,000.

The 12-mile line would include 3 miles of $10^{3}/_{4}$-in. and 9 miles of 20-in. pipe.

40-Mile Gas Pipe Line Is Authorized in New York

Authorization has been given Central Hudson Gas & Electric Corp., of Poughkeepsie, N. Y., by Federal Power Commission, to construct a 40-mile natural-gas pipe line which will be used for gas distribution in Dutchess, Orange, and Ulster counties, New York. The firm now supplies this same area with manufactured gas.

Home Gas Co., Pittsburgh, was authorized in an FPC concurrent order to build, at a cost estimated at $18,000, a metering and regulating station at Tuxedo, N. Y., which will be used to supply Central Hudson's natural-gas requirements.

Central Hudson's new line will extend from the Tuxedo connection with Home Gas Co.'s line, now under construction, north to Central Hudson's gas plant in Poughkeepsie. Project includes an underwater crossing of the Hudson River, and estimated over-all cost of the facilities has been set at $1,700,000.

Peak-day demands of Central Hudson have been estimated from 5,200,000 cu. ft. in 1951 to 7,700,000 cu. ft in 1953. The firm expects to be able to take deliveries from Home Gas Co by August of next year.

Among those to receive natural-gas service when the new facilities are completed is the U. S. Military Academy at West Point.

Michigan-Wisconsin's Rate Schedule Remains in Effect

An interim rate schedule which was filed by Michigan-Wisconsin Pipe Line Co., and which was permitted to remain in effect until November 30 by Federal Power Commission, has been extended until January 2, 1950. The commission directed, in modifying the previous order, that the firm file a natural-gas tariff satisfactory to FPC on or before the latter date.

The previous order had permitted the interim rate schedule to remain in effect until the end of November *(The Oil and Gas Journal, November 3, 1949, page 113)*. The schedule covers natural-gas service through pipe-line facilities authorized by FPC last August. These facilities include provision for a total of 155,000,000 cu. ft. of gas per day in Michigan - Wisconsin's Texas-to-Michigan pipe-line projects

Fire Does $100,000 Damage To Panhandle Eastern Line

A blowout and fire at the Centralia, Mo., compressor station on Panhandle Eastern Pipe Line Co.'s 24-in. natural-gas line caused damage estimated at approximately $100,000 last week.

A company spokesman said that emergency crews were to construct a bypass line around the compressor station, but added that supply of gas to eastern points would be reduced until repairs to the main line could be completed.

Mississippi River Fuel's Line to St. Louis Finished

Mississippi River Fuel Corp.'s $35,000,000 natural-gas pipe line between Perryville, La., and St. Louis has been completed. After a series of tests it will begin operation, and will provide St. Louis with a daily gas volume of 133,000,000 cu. ft., doubling the gas supply to that area.

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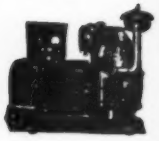

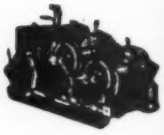

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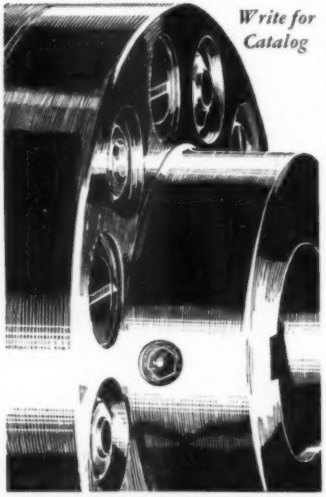

AJAX FLEXIBLE COUPLING CO. INC.
18 ENGLISH ST., WESTFIELD, NEW YORK

REFINING

Texaco's Lawrenceville Works Being Enlarged

CONSTRUCTION work has begun on a major expansion program for The Texas Co.'s Lawrenceville (Illinois) refinery. Present plans call for addition of four major processing units, installation of new high-pressure steam boilers, and expansion of tank storage and pipe-line facilities.

The principal unit will be a fluid catalytic cracking unit with a design capacity for charging 19,000 bbl. per day. This first cat cracker at the Lawrenceville works will produce about 10,000 bbl. of high-quality gasoline daily. It is designed and will be erected by M. W. Kellogg Co. and will be located just east of the existing thermal cracking units in the plant.

Foster Wheeler Corp. has the contract for design and construction of a 20,000 bbl. per day atmospheric and vacuum crude distillation unit. This unit is designed to handle high-sulfur crude.

A catalytic polymerization unit will be constructed by Kellogg, and a copper sweetening unit for treating the gasoline from the fluid catalytic cracking unit will be added. Design and installation of the new boiler plant will be handled by The Texas Co.'s own organization.

The two primary contractors have begun work in the plant. Raymond Concrete Pipe Co. has completed piling for the cat cracker and is now driving piles for the new boiler plant.

Texas Co.'s Lawrenceville works, formerly operated by Indian Refining Co., was rated before expansion at 27,000 bbl. daily crude capacity, with 15,000 bbl. of daily thermal cracking capacity. It is a complete refinery, making a line for fuels and lubricants. H. S. McCray is superintendent of the plant.

Lawrenceville is the fourth company plant scheduled for major postwar construction. Modernization and expansion at Port Arthur is complete. A new 30,000-bbl. crude unit and fluid catalytic cracking and polymerization facilities are now going on stream at the company's West Tulsa Works. At Eagle Point, N. J., the company's completely new 40,000-bbl. refinery will be on full stream shortly after the first of the year.

Fire Damages Gasoline Unit At Texaco's Tulsa Refinery

TULSA.—Damage estimated at $150,000 was caused by an explosion and fire at the gasoline plant of The Texas Co.'s refinery at West Tulsa last week. One worker was killed and three others injured.

Cause of the explosion was not learned immediately, but it is believed a pumping unit exploded, and vapor in a pump house ignited.

The installations affected by the blaze were in the old portion of the refinery, and flames were kept under control by the company's own fire-fighting units.

W.P.R.A. Reports Shipments Of Mid-Continent Lube Off

Western Petroleum Refiners Association reports that production and shipment of lubricating oils in the Mid-Continent area continued to decline in October. It based its report on operations of 13 operating companies, and disclosed that October production amounted to 1,222,534 bbl., a decline of 10.4 per cent the same month a year ago.

Total shipments in October amounted to 1,190,809 bbl., down 15.5 per cent from October 1948. Domestic shipments of 1,156,290 bbl. were down 16.2 per cent, while exports advanced 14.1 per cent, W.P.R.A. said.

Taylor's 22,500-Bbl. Plant Shut Down for Conversion

HOUSTON.—Taylor Refining Co.'s 22,500-bbl. plant near Corpus Christi, Tex., has been shut down for conversion work, company officials have announced.

The plant has been operating its three units (two cracking and one skimming) at maximum capacity as skimming units since the end of the war. During the current conversion work, one cracking unit will be shifted to reforming while the other will revert to cracking. While operating as a skimming unit, the Taylor plant has run as much as 32,000 bbl. daily.

Company officials estimate that the conversion will require 4 to 5 weeks. Company engineers and maintenance crews will handle the job.

Taylor's modernization program was explained in the annual report to stockholders recently issued by Petroleum Heat & Power Co. (Petroleum Heat owns majority stock of Taylor). The report stated that ultimate necessity of operating a catalytic cracking unit to produce higher octane-rating gasoline has long been recognized.

"However," the report continued, "the active export market which prevailed from the termination of World War II to a few months ago permitted refineries to operate profitably with equipment now in use. Under present conditions, however, unless products in excess of the needs of the marketing division can be sold to agencies of the Government or in the dwindling export trade, the modernization program discussed herein will have to be undertaken as soon as financial arrangements can be made."

A.I.Ch.E. Devises New Test Code for Heat Exchangers

PITTSBURGH.—Manufacturers and users of shell-and-tube heat-transfer equipment are going to be asked to agree to a new testing code devised by the American Institute of Chemical Engineers. The code was presented to the A.I.Ch.E. at a meeting held here December 5 after review by oil companies and other interested groups.

The objective of the proposed code is standardization in performing and interpreting tests to obtain reliable data on these heat exchangers. In its present form the code is limited to shell-and-bare-tube equipment where only a sensible heat transfer takes place.

This code is the first of a series devised by A.I.Ch.E. subcommittees. Others forthcoming include standards for testing and building distillation equipment and absorption towers.

Government to Sell Corpus Aviation-Gasoline Plant

The General Services Administration, War Assets, has advertised for sale a refinery at Corpus Christi, Tex., which was constructed in 1944 and operated by Great Southern Corp. as an aviation-gasoline plant.

The agency advertised that bids would be opened on December 29. The installation is being offered either on an "on site" basis or on a basis whereby all facilities will be removed from the land.

The refinery, identified by the Government as Plancor 638, is comprised of feed-preparation unit, reforming, dehydrogenation, HF alkylation, and general facilities. Pontiac Refining Co. furnished naphtha charge stock *(The Oil and Gas Journal, February 17, 1949, page 95)* and four nearby cycling plants furnished butane-isobutane stock. During wartime operation production averaged 5,270 bbl. per day of 100-octane gasoline.

Facilities, if modified, would be capable of producing butylene, butadiene, benzene, toluene, xylene, and other aromatics, GSA said. Over-all facilities with complete auxiliaries "may be regarded as a nucleus for establishing production of a wide range of petrochemicals," the agency's advertisement read.

Shell Group Meets to Plan Future Research Program

Plans for future scientific investigation, aimed at producing greater amounts of useful products from crude oil, were discussed by top executives, technical, and research men of Shell Oil Co. and Shell Development Co. at a semiannual research conference near Phoenix recently.

More than 100 scientists from Shell research laboratories at Houston, Wood River, Ill., and Martinez and Emeryville, Calif., contributed to the discussion.

Dr. M. E. Spaght, president, and A. J. Johnson, vice president of Shell Development Co., were among those attending from the San Francisco Bay area. Also attending were J. H. (Jimmy) Doolittle, F. S. Clulow, and C. E. Davis, vice presidents of Shell Oil, and W. P. Gage, vice president, Shell Chemical Corp.

Simultaneously, in New York Shell Oil announced the discovery of a new fuel-oil ingredient that, according to the company, "may prove as important to the domestic-heating field as tetraethyl fluid is to gasoline." H. S. M. Burns, president, described the ingredient as "FOA-5X." It was developed at the company's Sewaren, N. J., fuel-oil and oil-burner laboratory.

Sinclair Offers New Fluid

Sinclair Refining Co. is offering an approved automatic transmission-type fluid for passenger cars, the company reported. Known as Sinclair Automatic-Transmission Fluid, Type A, the product qualifies and has been authorized for all hydraulic transmissions. Engineers estimate that demand for this product will exceed 30,000,000 gal. annually within the next 5 years.

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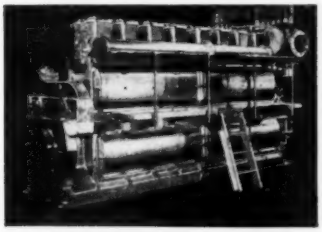

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Exploration and Drilling

Town-Lot Drilling Looms in Wyoming

THE Rocky Mountain area is claiming much interest as a result of two strikes that appear important: one in Wyoming which looks like it would set off Wyoming's first town-lot drilling campaign, in Glenrock; the other in Southwest Nebraska, where a wildcat has had oil in the first Dakota sand, followed by some gas in the second Dakota, and finally substantial amounts of gas in the third Dakota, all at less than 5,000-ft. depth.

In Wyoming, Steelco Drilling Co. has what looks like better than a 1,000-bbl.-per-day strike in the Muddy sand at 7,202-26 ft., about ¼ mile north of the corporate limits of Glenrock, location being the 1 McDonald, SW NE SE 32-34n-75w. The Steelco well is on a 160-acre farmout in a 15,000-acre block of Phillips Petroleum Co., probably taken on a seismic high. Reasonably reliable reports indicate that three town-lot drilling commitments have already been made, subject to title check.

Geologists are studying the regional background carefully, and it is a safe bet that the new strike will step up interest in the whole south side of the Powder River basin. The Steelco strike is in the southwest corner of the basin, where Big Muddy field is found on a regional high that results in steep dips to the northeast, and the new find is down-dip from Big Muddy, on the steep flank of this regional high.

At the moment, two general geological theories are being discussed. One is that the oil accumulation is structural, on a high formed by closure against a large fault, probably somewhere near the west end of the Phillips block, and probably revealed by seismic data. The other theory is that it may be a stratigraphic trap formed by deposition of clean sand around the flanks of a regional high. Whatever theory is accepted must account for an unusually thick section (24 ft.) of pretty clean sand for the Muddy.

From an economic standpoint, the Steelco strike is almost perfectly located, and the oil is around 40° gravity, green, and sweet. Glenrock is the site of a refinery, and the Casper refineries lie only about 25 miles west. There are pipe lines within a few miles of the well. Past history of the Rocky Mountain area indicates that light-oil strikes are developed and produced, even if it results in further cutbacks of the currently available black, high-sulfur oil.

The Nebraska strike, which will increase interest in the Denver basin, is Ohio Oil Co. 1 Cruise, NW SW SE 7-14n-49w, Cheyenne County. The new test is about 5 miles southwest of Gurley pool, where Dakota oil has been found in some five wells. First Dakota sand topped at 4,620 ft. was silty to 4,650 ft., but drill-stem test at 4,650-60 ft. recovered some light green oil in 45 minutes. Bottom of the first Dakota is not given, but drill-stem test in second Dakota at 4,660-83 ft. indicated 2 million cubic feet of gas per day. Third Dakota sand was topped at 4,736 ft., and three drill-stem tests at successive intervals totaled an indicated rate of 16 million cubic feet per day. First test at 4,736-50 ft., in 45 minutes, gave gas at rate of 6 million cubic feet per day; second test at 4,751-61 ft. was rated gas flow of 4 million cubic feet per day; third test at 4,771-81 ft., gave gas at rate of 6 million cubic feet per day.

The new gas production is only about 30 miles south of the gas pipe line that runs from Sand Draw through Casper, thence southeast into Nebraska to serve Scotts Bluff, Bridgeport, and Oshkosh. There is also a sizable local market in Southwest Nebraska and Northeast Colorado that could be served profitably.

Charles J. Deegan

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

WEST TEXAS.—A count on Scurry County drilling wells this week shows approximately 140 wells in operation, and operators generally agree the figure will reach 200 before the peak is reached, if then. Lion Oil 23 McLaughlin, NE SE 201-97 H&TC, Diamond M field test which was being carried to the water, had the reef at minus 4,293 ft., and a drill-stem test from 6,897-6,907 ft., minus 4,503 ft., was still out of the water. The well did not flow on the 9½-hour test, but headed oil for 2 hours, and recovered 1,840 ft. of light, high-gravity oil. Following the test it was cored ahead. A Tom Green County Ellenburger failure was resurveyed, to indicate a possible oil-bearing section of reef lime. In Terry County, Tide Water 1 Nystel had good prospects of discovery production from a section tentatively identified as Siluro-Devonian.

ROCKY MOUNTAIN AREA.—Recovery of oil in the Sussex sand by Delhi Oil Corp. at its semiwildcat 1½ miles south of production in Sussex field, Johnson County, Wyoming, was considered of importance. An additional 10,000,000 cu. ft. of gas has been tested by the Ohio Oil Co. at its second western Nebraska wildcat. Leasing is reported very active in the south central Powder River Basin of Wyoming following discovery of oil by Steelco Drilling Co. in the Glenrock Area.

CANADA.—What may prove to be an important new producing area on the west edge of Leduc field has been opened by Ross Petroleums, Ltd., at its 2 Leduc, LSD 10, 13-50-27w4. The well found the usually productive D2 zone tight and went on to the D3 horizon where a drill-stem test was run. Oil flowed to the surface 11 minutes after tester was opened. Recovery included some 400,000 cu. ft. of gas, natural.

SOUTHWEST TEXAS

Hidalgo "Tight" Hole Reportedly Flows Oil

CORPUS CHRISTI.—Eight miles south of Pharr, Hidalgo County, Taylor Refining Co. and Mayfair Minerals, Inc., are reported to be flowing their 1 B. F. M. Klump at the rate of 5 bbl. of oil per hour, through 1/4-in. choke, with 600 psi. tubing pressure. This "tight" wildcat is bottomed at 10,407 ft. with 5 1/2-in. liner set at that depth. No details have been released as to the level from which the well is producing.

Humble Oil & Refining Co. is swabbing in its 1 W. Mueller, Jr., northwest extension well to Sarita field, Kenedy County. The well was drilled to a depth of 9,601 ft. and 5 1/2-in. casing was set to 4,714 ft. for completion attempt. Casing was perforated at 4,618-28 ft. for the test. A drill-stem test run on these perforations flowed oil and recovered oil-cut mud. When tubing was run, the well failed to flow, and is being swabbed in.

The Chicago Corp. of Corpus Christi has extended production in the Saxet-Deep area on the East flank of the field, Nueces County. The 1 H. E. Butt Grocery Co. was drilled to a depth of 7,008 ft. and topped the pay zone at 6,917 ft. Perforations were made at 6,914-20 ft. and on potential gage the well flowed 162 bbl. of 41°-gravity oil per day through 1/4-in. choke.

Union Producing Co. 1 Virginia H. Tatton promises to open a new oil pool approximately 4 miles north of Lamar field and 4 miles southwest of St. Charles field, Aransas County. Operators are drilling ahead below 10,523 ft. after indications of oil production were made on drill-stem test at 10,228-10,523 ft. in open hole below the casing seat. The tool was open 2 hours and 8 minutes, and recovery was 15 stands of oil and 10 stands of mud. The prospective discovery is in the John Durst Survey, Abstract 51.

Delhi Oil Corp. 3 Hagist Ranch, Inc., wildcat approximately 6,300 ft. southwest of production at Loma Alta-Wilcox field, McMullen County, has casing on the ground and is expected to set pipe for a probable gas completion. The well tested gas in the upper Wilcox sand, which was good for approximately 5,000,000 cu. ft. per day, but found the lower sand too tight to produce.

The 67 new locations in southwest Texas include 26 wildcat starts: 1 each in Caldwell, Gaudalupe, Williamson, Aransas, Nueces, San Patricio, and Starr counties; 2 each in Bastrop, Milam, Cameron, Duval and Jim Wells counties; 3 each in Jim Hogg, Webb, and Zapata counties.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCATS

Aransas County: Gas-condensate discovery at Mud Flats—Geo. W. Graham 1 Margaret E. Davis, Lot 7, Blk. 48, Resubd. of Sixth Addn. of Taft Farm lands, 8 1/2 mi. N-NE Gregory townsite, TD 9,269 ft., top sand 9,251 ft., perf. 9,251-54 ft., 192 bbl. of 52.5°-gravity condensate plus 2,440,000 cu. ft. of gas per day, 3 16-in. choke, TP 2,800 psi.

Caldwell County: New oil discovery—Fred J. Adams 1 C. J. Ohlendorf, S. B. Morrison Sur., 2 mi. S Martindale, top sand 872 ft., TD 882 ft., open hole 860-82 ft., 31 bbl. of 30°-gravity oil per day on pump.

Duval County: New oil pool—Jergins Oil Co. of Texas 1 Albert Martin, Tr., GC&-SF Sur. 171, A-861, 5 mi. NW Hebbronville, top sand 3,057 ft., TD 3,217 ft., perf. 3,057-68 ft., 93 bbl. of 40°-gravity oil per day, 1/4-in. choke, TP 50 psi., CP 500 psi., GOR 146.

Kleberg County: New oil pool at Cement—Henshaw Bros. & O. R. Mitchell 1 J. E. Humble, Sec. 45, Geo. H. Paul Subd. of Driscoll Ranch, top sand 6,620 ft., TD 7,064 ft., perf. 6,620-28 ft., 36 bbl. of 39.5°-gravity oil per day on pump.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Bastrop County: E. H. Griswold et al 1 Frank Freytag, Thomas J. Gazley Sur., 2 mi. S Smithville, dry, TD 1,480 ft.

Bexar County: Star Oil Co. 1 J. J. Loep, Jose de la Garza Grant, 13 mi. SE San Antonio, 1 mi. SW of Elmdorf, dry, TD 3,017 ft.

Duval County: Morris Cannan 1 Cain, Cain & Smith, SM&S Sur. 255, A-590, 5 mi. NW Piedras Pintas field, dry, TD 500 ft.

Luling Oil & Gas Co. B-1 Brigidia Garcia, AB&M Sur. 412, A-1774, 9 mi. NW San Diego, 2 2/3 mi. E-NE Fitzsimmons field, dry, TD 4,720 ft.

Jim Hogg County: Danciger Oil & Refining Co. & Republic Natural Gas Co. 1 Louis Armstrong, M&C Sur. 107, 5 mi. W Hebbronville, dry, TD 3,140 ft.

McMullen County: Delhi Oil Corp. 1 John Murphy heirs, AB&M Sur. 123, 20 mi. N Freer, dry, TD 2,252 ft.

Webb County: Shell Oil Co., Inc., 1 Duval Ranch Co., Zapata County School Lands Survey 4, A-1916, 2 1/2 mi. S Moca field, 15 mi. W Freer, dry, TD 8,117 ft.

SOUTH LOUISIANA

Acadia Parish Wildcat Logs Possible Oil Sand

NEW ORLEANS.—Five feet of possible oil sand is indicated in Peterson Drilling Co. 1 P. J. Thevis, Acadia Parish wildcat 1 1/4 miles north of North Crowley production. The hole is bottomed at 11,085 ft. with log run to that depth. Operators are now running casing and plan to drill deeper, but if no further shows are obtained they will plug back to make a test of the sand. This test, located in C NW NW, Section 22-8s-1e, is approximately 3 miles northeast of Hunt's 1 Robison.

Hassie Hunt Trust is still working on stuck pipe, milling on the junk at 10,557 ft. in the 1 Robison. Operator has been working on stuck pipe in this venture for several weeks, trying to begin testing operations. The test is reported to have 80 ft. of gas sand and 30 ft. of sands with oil shows.

Ohio Oil Co. is rigging up on the 1 E. W. Brown, Jr., the first deep test of a salt dome in the floating marshes of Calcasieu Parish.

Gulf Oil Corp. is drilling below 13,000 ft. in sidetracked hole in the 1 Provost-Cyre Unit, Iberia Parish wildcat in the Weeks Island area. The test is projected to 14,500 ft. to test the Miocene sand.

Bateman Drilling Co. has reached a total depth of 11,020 ft. in the 1 N. O. Plantation Co.-State Lease 706, wildcat approximately 2 miles north of Barataria, Jefferson Parish. Operators are now preparing to run a log to that depth.

The 25 new locations in South Louisiana include only 1 wildcat start, which is located in St. Mary Parish.

SOUTH LOUISIANA SUCCESSFUL WILDCAT

Plaquemines Parish: New gas - condensate discovery in West Delta Block 27 area, offshore—Humble Oil & Refining Co. A-3 T. P. State Lease 818, Tract 1199, Blk. 27, top sand 9,475 ft., TD 10,900 ft., perf. 9,475-80 ft., 25 bbl. of 64°-gravity condensate plus 734,000 cu. ft. of gas daily, 1/4-in. choke, GOR 30,500, TP 2,800 psi.

SOUTH LOUISIANA WILDCAT FAILURES

Beauregard Parish: Louisiana Oil & Development Co. 1 Meadows-Bennett, 13-3s-12w, 2 mi. NW Neale production, dry, TD 2,000 ft.

Plaquemines Parish: Richardson & Bass 1-F State Lease 1673, 39-14s-14e, dry, TD 11,989 ft.

St. Bernard Parish: Shell Oil Co. 1 State Lease 128, Comfort Isle area, 13-13s-18e, dry, TD 12,319 ft.

ROCKY MOUNTAIN

Delhi Finds Oil in Well Near Sussex Field

DENVER.—On drill-stem test between 3,954-3,974 ft. at 1 Government, SE NW NE, 35-42n-78w, Johnson County, Wyoming, Delhi Oil Corp. of Dallas, Tex., recovered 1,470 ft. of 40.5°-gravity oil in 1 hour. Top of the Sussex sand was logged at 3,937 ft. and on previous test between 3,939-3,954 ft. the well made 900 ft. of oil in 55 minutes. Flowing pressure on the second test was 420 psi. and shut-in pressure 1,325 psi. Because of its location 1 1/2 miles south of Sussex field proper and the fact that the well is running higher structurally than expected, the recovery of oil in this well is considered of importance. First discovery of oil was made at Sussex in 1948 and Continental Oil Co. now has nine wells producing from the Lakota, Shannon and Sussex sands. The Sussex is a stray sand found above the Shannon and does not correlate with sands found in the Salt Creek field, 10 miles south of Sussex. Continental has a block now being unitized immediately south of the new Delhi area. American Liberty Oil Co. has drilled three dry holes south and west of the Sussex field proper.

At its 1 Cruise, NE SW SE, 7-14n-49w, in the Huntsman area, Cheyenne County, Nebraska, the Ohio Oil Co. has now tested 1,000 cu. ft. of gas in two sections of the third Dakota. Third Dakota was topped at 4,736 ft., and on drill-stem test between 4,736-4,750 ft. the well flowed at the rate of 6,000,000 cu. ft. daily on 45-minute test. Flowing pressure reached 1,080 psi. and shut-in. pressure 1,200 psi. On a subsequent test between 4,751-4,761 ft. the well made 4,050,000 cu. ft. This gas discovery is of importance as the first in the western Nebraska area in the discovery of oil by Ohio in its Gurley pool eary this year. The Gurley pool is producing 34°-gravity oil from the first and third sections of the Dakota series and Ohio now has five producing wells in this area. On drill-stem test in the first Dakota at the Huntsman wildcat Ohio recovered 100 ft. of 38.8°-gravity oil in 45 minutes. The Huntsman wildcat is located 6 miles southwest of the Gurley pool and approximately 3 miles north of the town of Sidney. It is considered that there is an immediate market for this gas in the town of Sidney. Ohio is now coring ahead on the wildcat which is scheduled to go to granite at around 8,000 ft.

Steelco Drilling Co. of Chicago perforated casing opposite Muddy sand at its 1 McDonald, SE NW SE, 32-34n-75w, Glenrock area, Converse County, Wyoming, and is now building tankage prior to testing. The zone between 7,202-7,226 ft. was perforated with 176 holes and the well was allowed to flow oil and mud in cleaning itself prior to shutting it in before completion gages. This discovery half a mile north of the town of Glenrock has caused considerable excitement with an immediate prospect of town-lot drilling. The well is located in the center of a Phillips Petroleum Co. block acquired following seismic work. Following tests 10 days ago when the well flowed 14 minutes there was an immediate leasing campaign in the south central section of the Powder River Basin. Continental Oil Co., Phillips Petroleum Co., General Petroleum Corp. and others have reportedly acquired leases in this area.

New locations.—There were 18 new locations during the week with 10 in Wyoming, 5 in Montana, 2 in western Nebraska and one in Colorado. In Wyoming the majority of new locations were in the Fiddler Creek area, Weston County. Location was made for an interesting extension at 1 Francis Mulligan, C NW NE 12-44n-6w, 1 mile southeast of the present drilling well in the Lightning Creek area, Niobrara County, Wyoming. Operator on the new extension is McKinley Oil & Drilling Co

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of Denver. In Colorado Carter Oil Co. made location for a 5,700-ft. Lakota wildcat in the Fort Morgan area at 1 Blanchard, C SE NE 11-6n-55w. H. L. Hollingsworth et al are drilling below 2,000 ft. on a wildcat, 1 Neeland, C NE SE 30-30n-48w, in the Cottonwood area, Dawes County, Nebraska.

Completions.—There were only nine completions in the Rocky Mountains during the week with 7 in Wyoming and 2 in Colorado. In Wyoming Westates Petroleum Corp. abandoned its wildcat in the Table Hills area southeast of the Mahoney-Ferris fields. The Westates well went into Tensleep and found both Phosphoria and Tensleep hard and tight with no shows. In Colorado there were two wildcat failures. Lowell & Voltz plugged their Gossard Dome wildcat located northwest of the Iles field, Moffatt County. Pure plugged its west Douglas Creek failure after testing Nugget at 6,130 ft.

WILDCAT FAILURES IN WYOMING

Table Hills, Carbon County: Westates Petroleum Corp. 1 Govt., NW SW SE 12-25n-87w, 7,361 TD; abnd.; Steele Shale 142, Niobrara 2,600 (?), Frontier 3,720, Mowry 4,320, Cloverly 4,960, Morrison 5,050, Sundance 5,280, Chugwater 5,480, Alcova lime 6,020 (?), Phosphoria 6,800, Tensleep 7,065; El. 6,861 KB.

Sage Creek, Park County: Kirk Oil Co. 1 Culp, C NE NE 14-57n-98w, 1,173 TD; abnd.; Peay 1,151.

WILDCAT FAILURES IN COLORADO

Gossard Dome, Moffat County: Lowell & Voltz-Continental 1 State, SE NW SW 13-4n-93w; 4,559 TD; abnd.; Frontier 3,439, Dakota 3,868, Morrison 3,950, Entrada 4,301, Nugget 4,500.

West Douglas Creek, Rio Blanco County: Pure-General Petroleum 1 Govt., NW SE NW 29-2s-102w; 6,130 TD; abnd.; Mancos 1,380, Niobrara 2,740, Frontier 4,010, Dakota 5,251, Dakota sand 5,396, Morrison 5,462, Curtis 6,012, Nugget 6,046.

MISSISSIPPI

Wilkinson County Gets Its First Oil Production

JACKSON.—Wilkinson County has now been added to the list of oil-producing counties in Mississippi. Danciger Oil & Refining Co. completed the 2 G. W. Armstrong for 36 bbl. of 30°-gravity oil plus 625,000 cu. ft. of gas per day through 16/64-in. choke. The new field, "Possum Corner," is located in Section 5-4n-2w. The hole was drilled to a total depth of 8,307 ft. and plugged back to 6,205 ft. for completion. Production is through perforations at 5,083-89 ft.

On the east side of Carthage Point field, Adams County, H. L. Hunt encountered packer trouble while in the process of completing the 1 A. J. Brown. Rig is being moved off and workover rig will be moved in to finish completion. This test was drilled to total depth of 10,323 ft. and 5½-in. casing cemented to 10,321 ft. On preliminary test at 10,281-89 ft. in the lower Tuscaloosa, no gage was taken but the well flowed an estimated 140 bbl. of oil per day. The fluid recovered is very dark green, but gravity is high. Until further tests are made, it is impossible to determine whether this will be an oil or gas well.

Another prospective producer in Wilkinson County is J. D. Reese 1 N. H. Breaux et al, 31-4n-3w, which has been drilled to 6,868 ft. Electric log has been run. Top of the Wilcox was reported at 4,974 ft. Log and sidewall cores indicated oil sand in the top 4 ft. of a sand body at 5,226-38 ft., with bottom of the section carrying salt water. This sand is reported to be the equivalent of the 4,600-ft. zone of La Grange field.

In Bude field, Franklin County, The California Co. 1 J. Moak et al, NE SE 19-5n-4e, has cored 28 ft. net effective oil sand in the lower Tuscaloosa section. Cores were cut from 10,539-79 ft. This well is two locations south of the first test on the prospect, Barnsdall 1 Wilkinson, NE NE of the same section. The 1 Wilkinson had no sand in the lower Tuscaloosa and was completed as a dry hole.

MISSISSIPPI SUCCESSFUL WILDCAT

Wilkinson County: New field, "Possum Corner"—Danciger Oil & Refining Co. 2 G. W. Armstrong, 5-4n-2w, top sand 5,083 ft., TD 8,307 ft., perf. 5,083-89 ft., 36 bbl. of 30°-gravity oil per day, 16/64-in. choke, TP 725 psi.

MISSISSIPPI WILDCAT FAILURE

Franklin County: Barnett Serio 1 Geo. Dickinson, 8-5n-1e, dry, TD 7,005 ft.

ALABAMA WILDCAT FAILURE

Franklin County: Herbert Ogg and H. D. Easton 1-A Audie Harris, 26-8s-12w, dry, TD 2,999 ft.

FLORIDA WILDCAT FAILURE

Taylor County: Gulf Refining Co. 1 Brooks-Scanlon, Inc., Blk. 42, 9-8s-9e, dry, TD 5,517 ft.

EASTERN TEXAS

Continental Opens Field With Two-Zone Producer

DALLAS.—Continental Oil Co. completed its Royall National Bank from both the upper and lower Rodessa sections, producing 45°-gravity oil and 57°-gravity distillate, to open Tennessee Colony field. Location of the discovery is ½ mile southeast of Tennessee Colony, in west central Anderson County.

The well was drilled to 10,182 ft., and on an elevation of 342 ft., logged top of the Rodessa section at 8,820 ft. While the amount of distillate yielded on potential test was not reported, a 10-hour test after perforating in the lower Rodessa at 8,965-90 ft., using ⅜-in. choke, flowed 227 bbl. of distillate, plus 1,520,000 cu. ft. of gas daily, for a gas-oil ratio of around 6,800 cu. ft. Flowing casing pressure was 1,450 psi., and shut-in pressure was 3,500 psi.

Perforations in the upper Rodessa at 8,865-85 ft. were acidized with 3,000 gal., and the well swabbed with fluid level remaining at 8,800 ft. When the well started flowing it cleaned itself in 30 minutes, and on a 5-hour test gaged 175 bbl. of fluid, being part oil and part distillate, plus some gas. Following that, a 21-hour test tanked 105 bbl. of 48°-gravity oil, plus 175,000 cu. ft. of gas, through ¼-in. choke.

In Denton County, 4 miles northwest of Bolivar and about ½ mile south of production in the Bolivar field, Witherspoon & McCarty Estate, semiwildcat in the O. Wilcox Survey, rated a daily potential of nearly 500 bbl. of oil a day, based on a gage of 58.3 bbl. of 37.5°-gravity oil in 2 hours and 45 minutes. Gas-oil ratio was 240 cu. ft.

Failure was reported for Theck & Cross Drilling Co. 1 M. B. Justice, wildcat 7 miles southeast of the Bolivar field, in the J. Ayers Survey, A-2, and 4½ miles south of Sanger. An odor of oil was found at 2,395-2,400 ft., total depth, and on a drill-stem test from 2,371-2,400 ft. gas showed in 40 minutes. In 2 hours, recovery was 2,110 ft. of salt water. Bottom-hole pressure was 550 psi.

A new discovery or extension 1½ miles southeast of the Bolivar field, blew in while trying to run tubing, and was waiting on potential test for completion at last report. The new prospector is Lee Hicks 1 Mrs. Ethel Curtsinger, 1 mile northeast of the Bolivar townsite recovered 860 ft.

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Thousands and thousands of "drowning" wells have literally been "saved" by the BAKER Model "K" CEMENT RETAINER, Product No. 400. It is so successful for special and remedial cementing that experienced oil operators in every field in the world use it as "standard equipment." Here are some of the applications where the Baker Cement Retainer can prove to be a "life saver" for you . . . Squeeze Jobs • Recementing • Reducing Gas/Oil Ratios • Cementing Behind Sections of Pipe • Plugging Off Bottom Fluids • Testing Upper Cased Formations • Plugging Back to Upper Zones • Cementing Off to Perforate for Production • Cementing Bad Pipe • Used as a Casing Bridge Plug, with cast iron construction for *permanent* installations, and of magnesium alloy for *temporary* use. For complete details see your BAKER (or Composite CATALOG, or write to Baker Oil Tools, Inc., Houston, Los Angeles, or New York.

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of oil and 40 ft. of oil-cut mud on a 45-minute drill-stem test at 1,514-22 ft., total depth. Operators then set 5⅞-in. casing at 1,514 ft. with 50 sacks and drilled the plug. It was then the well blew in and heavy tools had to be moved in to run 2-in. tubing, after which the well flowed an estimated 350 bbl. of oil a day.

EAST TEXAS (DISTRICTS 5, 6 AND 6-P) SUCCESSFUL WILDCATS

Anderson County: Continental Oil Co. 1 Royall National Bank, A. G. Monroe Sur., A-46, ½ mi. SE Tennessee Colony, TD 10,182 ft., elevation 342 ft., perforated upper Rodessa 8,865-85 ft., flowed 108½ bbl. 45.5°-gravity oil in 24 hr., ½-in. choke, GOR 1,855 cu. ft.; perforated Rodessa 8,965-90 ft., flowed 2,800,000 cu. ft. of gas a day, plus unestimated amounted of 57°-gravity distillate.

Freestone County: Carter-Gragg Oil Co. 1 C. B. Robinson, James James heirs Sur., 7 mi. N Fairfield, TD 8,050 ft., elevation 313 ft., IP flowed 2,775,000 cu. ft. gas a day 14/64-in. choke, TP 1,575 psi., rock pressure 2,900 psi., had some amber-colored distillate, amount not reported.

EAST TEXAS (DISTRICTS 5, 6 AND 6-P) WILDCAT FAILURE

Houston County: R. M. Ballard 1 Lulu A. Holcomb, Daniel McLean League, A-37, 5 mi. E Augusta, dry, TD 5,893 ft., Austin chalk 5,510-5,765 ft., by samples.

N. CENTRAL TEXAS

Parker County May Have Caddo Lime Oil Production

WICHITA FALLS.—Parker County had prospects of Caddo lime oil production, 1,500 ft. east of a recent Caddo gas discovery at Farris Oil Co. and others 1 J. P. Hart heirs, E. A. Fleming Survey, and 2 miles southwest of Springtown.

With total depth at 3,658 ft., and casing set on bottom, it was perforated with 66 shots from 3,574-85 ft. and acidized with 500 gal. After several trips of the swab it kicked off and flowed oil and acid water, then shut in overnight. When opened the following morning casing pressure was 900 psi., and the well flowed 15 bbl. of fluid an hour, being 25 per cent oil and the balance acid water. It was still flowing to clean at last report.

Montague County.—An-Son Petroleum Corp., Oklahoma City, staked location for its 1 Pearl Cotton, ½-mile west offset to The Texas Co. 1 Haws, conglomerate discovery at 6,255-6,300 ft. Location of the new well is 539 ft. from east and 330 ft. from south lines, Section 61, ETRR Survey, and 4 miles southwest of Montague. Projected depth was 6,450 ft., with rotary tools.

Eight miles north of Bonita, Harvey Drilling Co. 1-B Ray Wines, semiwildcat in Block 95, Kaufman CSL Survey, completed from sand at 3,021-30 ft., pumping 50.5 bbl. of 31°-gravity oil a day. Further details were not reported.

Throckmorton County.—William Hamm 1 Bessie Rhodes, Section 302, BBB&C Survey, wildcat test 1¾ miles north of Throckmorton and about 2 miles south of production, kicked off and flowed oil from the Mississippian after acid treatment. The amount of flow was not reported. Top on the formation was 4,778 ft. The well was also credited with possible production in the Caddo lime from 4,336-66 ft., and the same operator has staked two offset locations, which will be Caddo tests.

The Caddo ventures and locations were: No. 2 Bessie Rhodes, 798 ft. east of west line and 3,066 ft. north of south line, Section 302, which is 520 ft. northeast of the 1 Rhodes. Same operator's 3 Bessie Rhodes is located 63 ft. east of west line and 2,330 ft. north of south line, Section 302, which lies 520 ft. southwest of the 1 Rhodes.

Archer County.—J. J. Lynn 3 A. J. DeMoss, Lot 17, Block 5, Clark & Plumb Subdivision, 5 miles southeast of Archer City in the new DeMoss area, set 7-in. casing at 3,625 ft., and was waiting on casing. Before running oil string, drill-stem tests from 3,625-30 ft., open 1 hour, recovered 40 ft. of oil and 30 ft. of mud. Bottom-hole pressure was 1,375 psi. A 1-hour test from 3,625-33 ft. had gas in 3 minutes and recovered 1,700 ft. of oil.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Callahan County: B. F. Phillips 2 R. D. Williams, 330 ft. from N, 330 ft. from W lines, Sec. 139, University Lands, 5 mi. NW Putnam, TD 4,109 ft., elevation 1,525 ft., PB 2,153 ft., pay 2,140 ft., IP flowed 141 bbl. 41°-gravity oil a day, ½-in. choke, TP 160 psi.

Montague County: Magnolia Petroleum Co. 1 Johnnie Carminati, 330 ft. from N and W lines, Blk. 193, J. Belcher Subd., 4½ mi. NW Montague, TD 6,380 ft., top pay 6,128 ft., IP flowed 35 bbl. 39.5°-gravity oil in 6 hr., 12/64-in. choke, GOR 564 cu. ft., CP 340 psi., TP 600 psi., Caddo discovery.

Throckmorton County: Rock Hill Oil Co. 1 Tom Morrison, Sec. 1,614, TE&L Sur., 8 mi. S Throckmorton, TD 4,681 ft., elevation 1,344 ft., top pay 3,566 ft., IP pumped 75.9 bbl. 40°-gravity oil a day, ripped casing 3,566-74 ft., shot 30 qt., Strawn discovery.

James H. Snowden 1 Guy Ellis, Sec. 686, TE&L Sur., 1 mi. SW Woodson, TD 3,067 ft., top Strawn pay 3,053 ft., IP pumped 33 bbl. 39°-gravity oil a day.

Warren Oil Corp. 1 Malcolm, Sec. 2,207, TE&L Sur., 3½ mi. NE Woodson, TD 4,596 ft., elevation 1,259 ft., top pay 4,565 ft., IP flowed 260 bbl. 42°-gravity oil a day, 12/64-in. choke, GOR 565 cu. ft., CP 775 psi., TP 840 psi., top Caddo estimated 3,852 ft., Mississippian 4,565 ft.

Wichita County: W. H. Hammon 1-A Louise T. Cook, Blk. 19, Cherokee CSL, 2½ mi. SE Wichita Falls, TD 4,883 ft., top Vogtsberger sand pay 4,861 ft., IP flowed 149 bbl. 41°-gravity oil in 6 hr., 24/64-in. choke, GOR 300 cu. ft., TP 750-175 psi., set 7-in. casing to 4,561 ft., used Hydrafrac instead of shot.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: W. G. Gouchie 1 G. A. Key and Tommie Estill, Sec. 2,434, TE&L Sur., A-606, ¼ mi. E Megargel, dry, TD 1,497 ft., broken sand with oil show 1,453-56 ft.

Jennings Drilling Co. 1 C. L. Abercrombie, Sec. 1, Hooper & Wade Sur., A-727, 1 mi. SE Archer City, dry, TD 4,025 ft., no shows.

Baylor County: Frank Wood 1 W. T. Waggoner "W," Sec. 80, T&NORR Sur., 4 mi. SW Dundee, dry, TD 5,292 ft., elevation 1,219 ft., lime 5,248-92 ft., dry.

Coleman County: Brannon & Murray 1 Mildred M. Woodward, Sec. 672, D. McDonald Sur., 1¼ mi. W Coleman, dry, TD 2,806 ft., elevation 2,283 ft., Jennings sand 2,435-85 ft., dry, Gardner 2,652 ft., DST recovered gas-cut mud.

Fisher County: Woods Drilling Co. 1 J. M. Dowell, R. H. Hibbitt Sur. 331, 5 mi. NE Roby, dry, TD 5,010 ft., elevation 1,901 ft., Noodle 3,160 ft., Flippen 3,450 ft., no shows or tests.

Hamilton County: Amerada Petroleum Corp. 1 John Briscoe, George Hodge Sur., 12 mi. NE Hamilton, dry, TD 4,468 ft., elevation 1,197 ft., Ellenburger had salt water, no tops reported.

Miller & Mueller 1 J. T. Brannon, D. Dawson Sur. 2, 14 mi. W Hamilton, dry, TD 3,060 ft., black shale 1,885 ft., lime 2,916 ft., slight show of gas 2,970 ft.

Jones County: J. O. Fox, Jr., 1 W. T. Green, J. Bliss Sur., 10 mi. SW Anson, dry, TD 3,377 ft., Valera 1,636 ft., base Coleman Junction 2,230 ft., top Swastika 3,305 ft.

S. C. Herring Drilling Co. 1 J. S. Thornton, Sec. 55, D&DA Sur., 5 mi. NE Anson, dry, TD 3,686 ft., elevation 1,646 ft., Palo Pinto 3,653-78 ft.

Knox County: Stanolind Oil & Gas Co. 1 Big Four Ranch Co., 35-4-D&W Sur., 23

mi. NW Benjamin, dry, TD 5,610 ft., Wichita-Albany 1,415 ft., base Coleman Junction 2,324 ft., KMA lime 4,385 ft., reef 4,600 ft., elevation not reported.

Shackelford County: Terry Hudson 1 W. H. Green, Sec. 31, BAL Sur., 8 mi. SE Albany, dry, TD 570 ft., gas sand 438-50 ft.

M. J. Mitchell 1 F. C. Pool, Sec. 34, University Sur., 1 mi. NW Moran, dry, TD 2,072 ft., elevation 1,358 ft., show gas 402 ft., 2,044 ft.

D. L. Rose 1 R. B. Elliott, Sec. 18, LAL Sur., 4 mi. W Sedgwick, dry, TD 4,296 ft., elevation 1,423 ft., Ellenburger 4,287 ft., had some gas.

Stephens County: A. G. Hill and Walter Duncan 1 B. L. Coalson, Sec. 58, Asylum Lands, 2½ mi. SW Potosi, dry, TD 4,355 ft., elevation 1,932 ft., Valera 690 ft., base Coleman Junction 1,310 ft., base Sedwick 1,491 ft., top Dotham 1,545 ft., Noode Creek 1,610 ft., Coal 1,900 ft., Home Creek 2,797 ft., Gray sand 4,240 ft.

Sojourner Drilling Co. 1 Mrs. Alva McCollum, Sec. 9, Blk 81, T&P, ½ mi. SW Merkel, dry, TD 3,436 ft., elevation 1,892 ft., DST 3,418-36 ft., recovered 700 ft. oil, 1,700 ft. salt water, formation not identified.

Throckmorton County: G. H. Brown (no farm name), Sec. 68, Comanche Indian Reservation, 7 mi. SW Throckmorton, dry, TD 1,058 ft., sand with oil show 1,054 ft.

L. F. Cox et al 1 A. E. Montgomery, Sec. 127, BBB&C Sur., 10 mi. W Throckmorton, dry, TD 5,763 ft., Caddo estimated 4,735 ft., Ellenburger 5,429 ft.

E. C. Johnson 1 Dewey Riley, Sec. 905, TE&L Sur., 6 mi. SW Woodwon, dry, TD 4,722 ft., Caddo 3,998 ft.

Miles & Pruett 1 Norton, Sec. 3,034, TE&L Sur., 8 mi. NE Throckmorton, dry, TD 650 ft.

Wilbarger County: Fortex Oil Corp. 1 Marchant-Allen, Sec. 112, Waggoner Subd., 5½ mi. NE Harrold, dry, TD 3,650 ft.

LA.-ARK.

Union Bottoms Sligo Field Well at 11,296 Ft.

SHREVEPORT.—In Bossier Parish, Union Producing Co.'s 1 Section 13 Unit, Sligo field deep test in 13-17n-12w, had total depth at 11,296 ft., and was thought to be in the Smackover, according to outside sources. At last report operators were preparing to run 7-in. protection string. On elevation of 214 ft., sample top on the Cotton Valley formation was 7,805 ft., and core top on the Bodcaw section was 8,101 ft.

In Caddo Parish, Plymouth Oil Co. 1 Thigpen-Herold, 12-17n-16w, ran electrical surveys and set 5½-in. casing at 5,995 ft., then perforated with 96 shots in the Rodessa from 4,779-4,803 ft. After a 2,000-gal. acid treatment, the well flowed an estimated 4 bbl. of oil an hour on ⅛-in. tubing choke. Tubing pressure was 540 psi. It was to test the Travis Peak, topped at 5,870 ft. Elevation is 197 ft. Total depth was 6,503 ft. Core recovery from the Travis Peak, between 5,896-5,925 ft. netted some 14 ft. of fine-grained shaly sand with light gas odor, but when a drill-stem test was attempted, there were 28 joints of pipe lost in the hole. At the time, there were no further reports on recovery of pipe or additional tests of the Travis Peak.

Gulf Refining Co. 1 M. M. Kinnebrew, deep operation in the Athens field of Claiborne Parish, 26-20n-7w, was in the Travis Peak, logged at 6,008 ft. on elevation of 343 ft., and was drilling ahead below 8,370 ft. By cores, the well has reported faint odor and oil stains in shale, siltstone and sand at 6,024-6,100 ft.; siltstone and shale with light odor of gas in spots from 7,336-7,423 ft., and fine-grained sandstone with faint gas odor from 7,700-7,800 ft.

Hunt Oil Co. 2 S. W. Owens, 12-23n-7w, Claiborne Parish, which reportedly ran some 1,400 ft. high on top of the Smackover, over the southeast offset, completed flowing 446 bbl. of 49°-gravity oil a day from the Smackover lime, identified as the "A" zone, with perforations at 9,735-9,944 ft. Tubing pressure was 950 psi. and gas-oil ratio was 1,350 cu. ft. Total depth was 10,297 ft. and elevation was 242 ft. Top on the Smackover was logged at 9,730 ft.; Buckner 9,670 ft., indicated porosity at 9,750-9,800 ft., and top of the "A" zone at 9,937 ft.

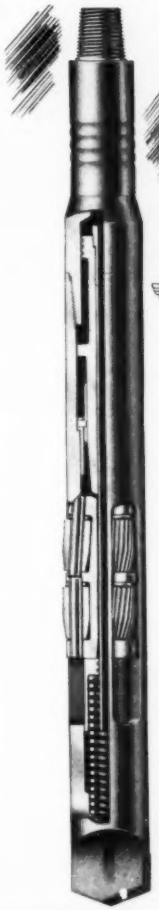
Ohio Oil Co. and Gulf Refining Co. 1 O. L. Martin, 3-22n-7w, Smackover wildcat in Claiborne Parish, was drilling below 11,040 ft., following a drill-stem test from 10,474-714 ft., which recovered the 3,800-ft. water cushion plus 272 ft. of gas-cut mud. Bottom-hole flowing pressure was 1,780 psi. The tool was open 27 minutes, which used ¼-in. top and bottom chokes. On elevation of 350 ft., the well has logged the Cotton Valley at 7,599 ft., and the Smackover at 10,402 ft.

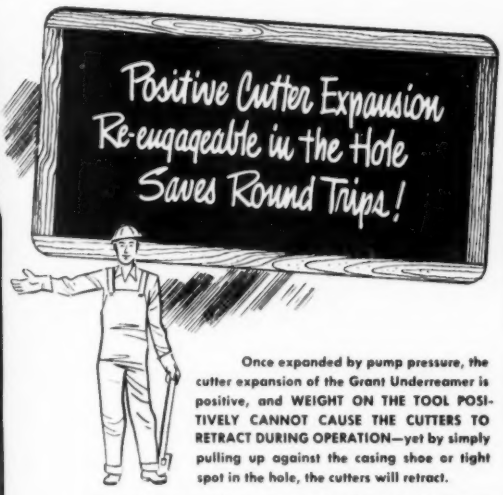
In Ouachita Parish, Petersen Drilling Co. 1 Breece Lumber Co., 30-17n-5e, ½ mile north of The California Co. 2 Breece, had total depth at 6,516 ft. and was waiting on cement after setting 5½-in. casing to 6,184 ft.

Four miles south of Junction City, Union Parish, Zack Brooks and others 1 Nelson, 29-23n-3w, had total depth in the Smackover at 9,805 ft., and was waiting on orders after running electrical surveys. Log on the Smackover was 9,317 ft., on elevation of 194 ft.

In Union County, Arkansas, C. H. Murphy & Co. 1 W. K. Gregory, SE SW 28-19s-18w, 5 miles southwest of Tubal, was drilling ahead at 7,908 ft., in the Cotton Valley after coring and testing.

A core from 7,747-56 ft. recovered 1 ft. of hard, tight sand with a show of oil, and





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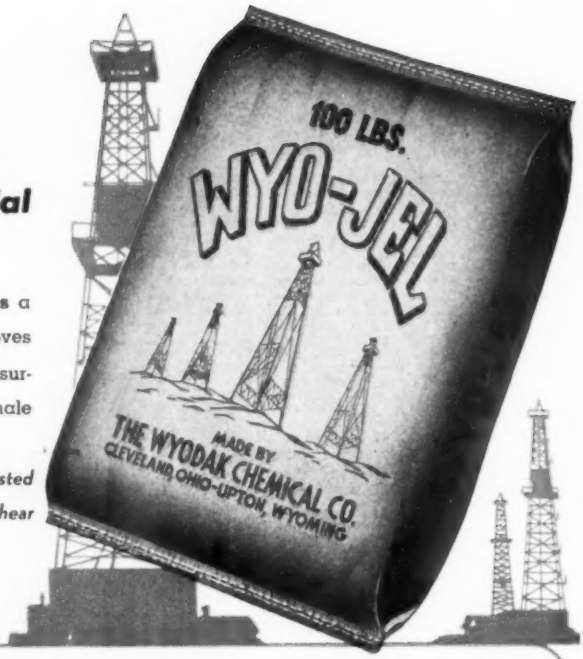

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Per cent Clay in Mix	6.0
Per cent Water in Mix	94.0
WEIGHT TESTS	
Pounds per cubic foot	65.1
Pounds per gallon	.68
Specific Gravity	1.045
Lbs. sq. ft./100 feet	44.90
VISCOSITY TESTS	
Marsh Funnel, API. Seconds (1500 CC in — 1 Qt. out)	47.3
Stormer Centipoises at 600 R.P.M.	15.0
FREE WATER SEPARATING	
1st hour	0.0
2nd hour	0.0
10th hour	0.0
ELUTRIATION TEST	
% Sand in Rotary Mud	0.05
SHEAR TEST (In lbs./sq. ft.)	
At start	0.0
After ten minutes	0.0

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WALL BUILDING TEST (Filter Cake)

Test at 100 lbs./sq. in. and Atmospheric Temperature

Time	cc. Water off	cc. per min.
1st Minute	1.3	1.30
5th Minute	4.2	0.84
10th Minute	6.4	0.64
15th Minute	8.0	0.53
30th Minute	11.9	0.40
60th Minute	17.2	0.29

cc. Water off 5th - 15th Minute 3.8
Thickness of Filter Cake, Inches ... 3/32

Test at 1000 lbs./sq. in. and 150° F Temperature

Time	cc. Water off	cc. per min.
1st Minute	5.8	5.80
5th Minute	10.0	2.00
10th Minute	13.8	1.38
15th Minute	16.4	1.10
30th Minute	23.2	0.77
60th Minute	32.0	0.54

cc. Water off 5th - 15th Minute 6.4
Thickness of Filter Cake, Inches ... 5/32

Yield: Barrels of Mud per ton of clay 100

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8 ft. of shale with no shows. A 10-minute drill-stem test with packer at 7,719 ft. recovered 50 ft. of mud with no shows. A second core from 7,779-89 ft. recovered 1 ft. of hard, shaly sand with slight oil shows, and 6 ft. of sandy shale with no shows.

NORTH LOUISIANA SUCCESSFUL WILDCAT

Concordia Parish: Hunt Oil Co. and Gulf Refining Co. 1 Metropolitan, 29-3n-7e, TD 8,548 ft., PB 7,107 ft., perforated Wilcox 6,916-22 ft., IP flowed 153 bbl. fluid, 12 per cent salt water, balance 52°-gravity oil, in 24 hr., ¼-in. choke, TP 440 psi., CP 1,040 psi., GOR 595 cu. ft.

NORTH LOUISIANA WILDCAT FAILURE

Jackson Parish: H. J. Strief 1 Louisiana Central Oil & Gas Co., SE NE 16-14n-1e, dry, TD 5,057 ft., elevation 180 ft., Wilcox 1,357 ft., Cretaceous chalk 3,259 ft., Saratoga 3,404 ft., Ozan sand 3,599 ft., Tuscaloosa 4,522 ft., Marine Tuscaloosa 4,910 ft., Massive 4,968-5,032 ft., lower Cretaceous 5,032 ft.

ARKANSAS WILDCAT FAILURE

Union County: Walter Lown 1 W. E. Baker, SE NE SE 22-16s-14w, dry, TD 5,689 ft., formations not reported.

OKLAHOMA

New Oil Pool Discovery Indicated in Coal County

A NEW pool, located 5 miles north of Coalgate, in Coal County, southeastern Oklahoma, appears to have been found by Britton Oil Co. in its 1 Polk, SE SW 23-2n-10e. Prospective production is from Booch sand, in which casing, cemented at 2,700 ft., was perforated at 2,140-65 ft. Casing also was perforated in a lower zone at 2,650-60 ft., although production is believed to be from the upper zone. The well is reported to have flowed a short time at an estimated rate of about 100 bbl. per day. Fluid rose 1,900 ft. in the hole in 24 hours. Further testing is awaiting additional tankage. Nearest production is in the Centrahoma pool, 8 miles to the west, one of the two small pools in the county.

Proving a new pay zone, the Oil Creek sand, for the Southwest Maysville pool, in Garvin County, California Co. 1 Robert Roller Unit, NE NW NW 36-4n-4e, flowed 247 bbl. of clean oil on a 24-hour gage through 9/64-in. choke. Casing was perforated at 8,532-40 ft. Hole had been drilled to 8,666 ft., where casing was run, and then plugged back to 8,585 ft.

The comparatively new Benjamin pool, in Hughes County, got one of its best wells to date in the testing by Beach Oil Co. and associates of their 3 Love, NW NE NE 14-8n-8e, which flowed 42 bbl. of 41.8° oil per hour from Cromwell sand at 3,300-21 ft. Flow was through open tubing. Location is in the west central portion of the pool.

OKLAHOMA SUCCESSFUL WILDCATS

Carter County: New pay in Healdton—Burton 1 Neustadt, SW SW SW 29-3s-3w, flowed 49 bbl. of 51°-gravity distillate from sand and lime at 6,105-6,385 ft., TD 6,693 ft.

Garvin County: New pay in Katie—Deep Rock 1 Grimes, NE NE 1-1n-2w, flowed 159 bbl. of 51°-gravity distillate from Gibson at 6,708-86 ft. and Heartshorne sand at 6,859-89 ft., TD 6,945 ft.

New pay in Southwest Maysville—California 1 Roller unit, NE NW NW 36-4n-3w, flowed 247 bbl. of 43.5°-gravity oil per day from Oil Creek at 8,532-40 ft., TD 8,666 ft.

Stephens County: Sinclair 1 Newman, NE SE SE 33-1s-4w, flowed 153 bbl. of 28°-gravity oil per day from sand at 6,025-6,223 ft., TD 6,347 ft.

OKLAHOMA WILDCAT FAILURES

Comanche County: Reding 1 Daye, NW NE SW 9-1n-11w, dry, TD 278 ft.

Creek County: Karam et al 1 Speakman, NW NW NW 28-18n-10e, dry, TD 2,741 ft., Layton 1,286 ft., Oswego 1,728 ft., Prue 1,831 ft., no Dutcher, Mississippi lime 2,738 ft.

Garvin County: Yoder 1 Lowrey, NE SW NE 24-4n-3e, dry, TD 1,119 ft., sand 935 ft. and 1,000 ft.

Falcon-Seaboard et al 1 Flippo, NW NE NE 10-4n-2w, dry, TD 6,190 ft., Gibson sand 5,797 ft., basal Pennsylvanian-Viola 6,169 ft.

Jefferson County: Peckham 1 Saunders, NW NW NE 10-4s-8w, dry, TD 5,005 ft., Canyon 4,005 ft., Arbuckle 4,375 ft.

Johnson County: Hammer 1 Aubrey, SW SW SW 17-2s-8e, dry, TD 2,051 ft.

Sloan 1 Moore, SW SE SW 29-3s-8e, dry, TD 273 ft.

Kay County: Nadel & Gussman 1 Vickers, SE SE NW 10-28n-3e, dry, TD 3,670 ft., Red Fork 3,142 ft., Mississippi chat 3,236 ft., Mississippi lime 3,258 ft., Wilcox 3,532 ft., Arbuckle 3,635 ft.

Kiowa County: Scarborough 1 Olson, SW SW NW 18-3n-16w, dry, TD 450 ft.

McClain County: Carter Oil Co. 1 Foster, C SW SW 26-9n-4w, dry, TD 10,090 ft. in bromide.

Murray County: Nye 1 Freeman, NW NE NW 6-1s-1e, dry, TD 1,724 ft.

Noble County: Woods Drilling et al 1 Dunlap, SW SW SW 27-21n-2w, dry, TD 5,452 ft., Avant 3,625 ft., Hogshooter 4,173 ft., Layton 4,244 ft., Checkerboard 4,486 ft., Oswego 4,598 ft., Mississippi lime 5,048 ft., Woodford 5,163 ft., Sylvan 5,203 ft., Viola 5,242 ft., sandy dol-

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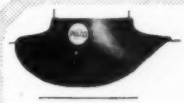

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omite 5,322 ft., Wilcox 5,340 ft., second Wilcox 5,432 ft.

Pontotoc County: Barnsdall 1 Sturdivant, NE SW NW 12-4n-5e, dry, TD 2,752 ft., Avant 337 ft., Hogshooter 583 ft., lime 835 ft., Calvin 1,212 ft., basal Pennsylvanian-Caney 1,560 ft., Mayes 1,725 ft., Woodford 1,850 ft., Hunton 2,124 ft., Chimney Hill 2,200 ft., Sylvan 2,237 ft., Viola 2,372 ft., bromide 2,616 ft., lower Wilcox 2,692 ft., sand 2,715 ft.

TEXAS GULF COAST

Tyler County Test Hits Cockfield Pay

HOUSTON—A new Cockfield sand pool is being opened by P. T. Sharples 6 miles northeast of Warren in Tyler County. The 1 Swearingen, Parker Survey, is reported flowing 5 bbl. of 46°-gravity oil an hour through a 6/64-in. choke from perforations at 5,696-97 ft.

Southern Minerals Corp. is running production test in its wildcat near Welder Ranch gas-condensate field of northern Victoria County, after cementing the 4½-in. drill pipe at total depth of 5,990 ft. Operators lost circulation in the well, 1 J. A. McFaddin estate, at that depth and stuck the drill pipe in the hole. After cementing the pipe, they perforated at 5,966-71 ft. for completion attempt. Previously, the well had cored shaly sand with gas odor at 1,790-1,805 ft., soft sand with oil and gas odor at 5,965-71 ft., and sand with oil and gas odor at 5,976-81 ft.

A new gas-condensate field for Live Oak County has been opened with completion of Western Natural Gas Co. 1 Block 77 unit, with no gage made on the well as yet. One drill-stem test run at 6,946-66 ft. recovered gas-condensate through ¼-in. chokes with good pressures. The well also recovered 700 ft. of oil with 1,300 psi. working pressure in 25 minutes on a drill-stem test at 6,518-28 ft. The test lies in the northwest corner of Block 77 of Simmons Subdivision, in R. W. Fant Survey 18.

Wesley West & J. M. West, Jr., have gaged the 1 West Securities Co. and Texas Long Leaf Lumber Co. for 35 bbl. of 32.3°-gravity oil per day through a 10/64-in. choke. The new discovery was drilled to a depth of 7,550 ft. and is producing through perforations at 3,342-52 ft. It lies in the A. Viesca League, southwest of Goodrich, and west of Livingston field, Polk County.

Humble Oil & Refining Co. continues to test its B-1 Mentor Northington et ux, wildcat in the Bonus area of Wharton County. The well is bottomed at 12,000 ft. The most recent test, through perforations at 10,238-44 ft., recovered 370 ft. of gas-cut mud and 2,965 ft. of mud and water. The tool was open 4¾ hours.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCATS

Austin County: New oil discovery — McCarthy Oil & Gas Corp. 1-A Leo Schiller et al, Adam Kuykendall Sur., A-243, 4½ mi. E New Ulm, dual completion, TD 10,206 ft.; top first pay 9,048 ft., perf. 9,048-58 ft., 299 bbl. of 41.1°-gravity oil per day, ¼-in. choke, GOR 1,176, CP 500 psi.; top second pay 9,467 ft., perf. 9,467-85 ft., 499 bbl. of 39°-gravity oil per day, 3/16-in. choke, GOR 1,250, TP 1,550 psi.

Goliad County: Gas discovery — Stanolind Oil & Gas Co. 1 J. Bluhm, Maria de Jesus Ybarbo Sur., 12 mi. NW of Goliad, TD 9,015 ft., perf. 8,042-50 ft., 6,800,000 cu. ft. of gas daily.

Lavaca County: New gas discovery at Seclusion—Sterling Oil & Refining Co. 1 Lafey Miller, A. S. White Sur. A-56, 5½ mi. SE Speaks field, 4½ mi. SW Provident City field, TD 6,600 ft., perf. 6,080-90 ft., 3,250,000 cu. ft. of gas per day, 10/64-in. choke, TP 225 psi.

Polk County: New oil pool—Wesley West & J. M. West, Jr., 1 West Securities Co. and Texas Long Leaf Lumber Co., A. Viesca League, A-77, top sand 3,342 ft., TD 7,550 ft., perf. 3,342-52 ft., 35 bbl. of 32.3°-gravity oil per day, 10/64-in. choke, GOR 605, TP 145-270 psi., CP 325-450 psi.

Victoria County: New oil pay at Victoria, Deep—Scurlock Oil Co. 1 Meta Buckert, Blk. 4, R-2, East Below town tracts, top sand 5,262 ft., TD 5,315 ft., perf. 5,267-74 ft., 153 bbl. of 40°-gravity oil per day, 11/64-in. choke, GOR 491, TP 650 psi., CP 1,500 psi.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Bee County: Dirks, Wood & Falco 1 J. E. Martin est., J. Poitevent Sur., A-265, 10 mi. NW Beeville, dry, TD 4,316 ft.

Chambers County: J. C. Chance Well SVC, Inc., 1 Broussard Trust et al, Jos. Roskopf Sur., A-574, 12 mi. NW Winnie, dry, TD 9,250 ft.

Frank W. Michaux 1 Hexom-Evans, J. M. Duvan Sur., Blk. 69, center of Lot 4, 4½ mi. N Winnie, dry, TD 8,900 ft.

Galveston County: Stewart Petroleum Co. 1 Stewart Title Guaranty Co., S. F. Austin League 4, A-2, 1½ mi. NW La-Marque, dry, TD 9,159 ft.

Jefferson County: S. A. Brewster and W. O. Bartle 1 L. Mays et al, Daniel Easley League, A-20, 3 mi. NW Amelia, dry, TD 7,550 ft.

Stanolind Oil & Gas Co. B-3 Gladys City Oil, Gas & Manufacturing Co., Spindletop Dome, Jno. A. Veatch Sur., dry, TD 8,815 ft.

Matagorda County: Wynn Crosby Drilling Co. & Southwestern Oil & Refining Co. 1 T. N. Maurtiz et al, SFRR, Sur. 547,

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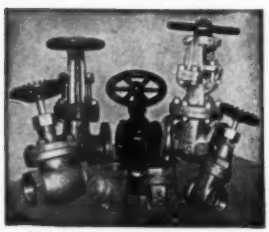

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A-462, 23 mi. E El Campo, 1 mi. N Arch field, dry, TD 7,617 ft.

Wharton County: Keystone Royalties, Inc., and The Salt Dome Oil Corp. 1 Charley O. Ward, K. R. Ferris Sur., Blk. 6, 1 mi. N Louise townsite, dry, TD 4,162 ft.

John F. Merrick 1 Anton Knebel, BBB&C Sur. 2, A-676, 1 mi. N Hillje, dry, TD 6,294 ft.

CALIFORNIA

McKittrick Field Gets Western Extension

LOS ANGELES.—The completion of 56-30 Rankin, a joint venture of Pacific Western Oil Corp. and San Joaquin Drilling Co., has extended production in McKittrick field ½ mile to the west. Location is in Section 30-30s-22e, 1,650 ft. north and 2,310 ft. south of the southeast corner.

Total depth of the well is 4,550 ft. with perforations at 4,488-4,549 ft. This interval is within the "Eocene 84" pool limits. The well came in flowing 600 bbl. of 36.2°-gravity oil per day through ¼-in. choke.

Tide Water Associated Oil Co. will attempt a further westerly extension of the "84" pool with a test in Section 25-30s-21e.

First tests made on Humble Oil & Refining Co.'s deep venture in the area between Newhall-Potrero and Del Valle fields resulted in a flow of oil, gas, and a small amount of salt water. The flow came from the interval 11,768-11,819 ft. The interval is made up of stringers. Operators are coring ahead in an effort to locate a bed of sand believed to be at a slightly greater depth. This well, the 1 N. L. & F., will not only prove a new area but also a productive zone deeper than found so far in Del Valle and Newhall-Potrero fields. It is located in Section 23-4n-17w.

North of Del Valle field, Standard Oil has set location for its 17 Sepulveda in Section 8-4n-17w. In the same area, Southern California Petroleum Corp. has obtained 40 acres in Section 9-4n-17w, and will make a test early next year.

Both Superior Oil and Richfield Oil have set locations for tests northwest of Russell Ranch production. Superior will drill the 18 U. S. Government in Section 2-11n-28w. Richfield has started work on the A-2 Florence in Section 21-11n-27w. The company's A-1 Florence found the intervals 3,170-3,285 ft. and 2,920-3,170 ft. dry on test. The new location is about 1,000 ft. northwest of the dry test.

Drilling & Production Co. will reenter its 47-33 O.M.B. in the Tejon area. The test, completed dry in August 1945, will be redrilled from the Chanac and deepened to the Reserve. This action follows the Reserve discovery in the Rose L. Bright well last October.

The Tulare County portion of Trico gas field is to have a deep test. The try will be put down by Trico Oil & Gas Co. as the 55 Tulare Farms, located in Section 27-24s-23e.

In the Arvin area, J. Zeaterelli has offset O. Darling's 1 di Giorgio, a dry hole. The section, 1-31s-29e, has had at least six tests in the last two years without getting production.

Lee Cutler, Blair Crist, and C. C. Chatham have purchased two old wells in Huntington Beach field. They plan to recondition and put the wells back in service.

The Standard Oil-Union Oil test in Kitsap County, Washington, has reached 2,700 ft. The test is drilling ahead in sand and shale.

CALIFORNIA SUCCESSFUL WILDCAT

Kern County, Devils Den area: Universal Consolidated Oil Co. 1 Devils Den fee, 23-25s-18e, pumping 75 bbl. of 18°-gravity oil per day, new fault block discovery, TD 2,311 ft., elev. 606 ft.

CALIFORNIA WILDCAT FAILURES

Kern County, Ant Hill area: Kern Oil Co., Ltd., 75 Bloemer, 26-29s-29e, dry, top Edison shale 1,900 ft., Transition zone 2,275 ft., Olcese 3,840 ft., Vedder 4,738 ft., TD 4,900 ft., elev. 969 ft.

McVan area: General Drilling Co. C-9 Fitzhugh USL, 14-27s-27e, dry, gray sand, TD 3,550 ft., elev. 907 ft.

San Luis Obispo County, Cholame area: Franco Western Oil Co. 1 Jack, 8-25s-16e, dry, TD 1,440 ft., elev. 1,184 ft.

Santa Barbara County, South Cuyama area: Bell Petroleum Co. 81-34 Elliot, 34-10n-27w, dry, TD 5,110 ft., elev. 2,650 ft.

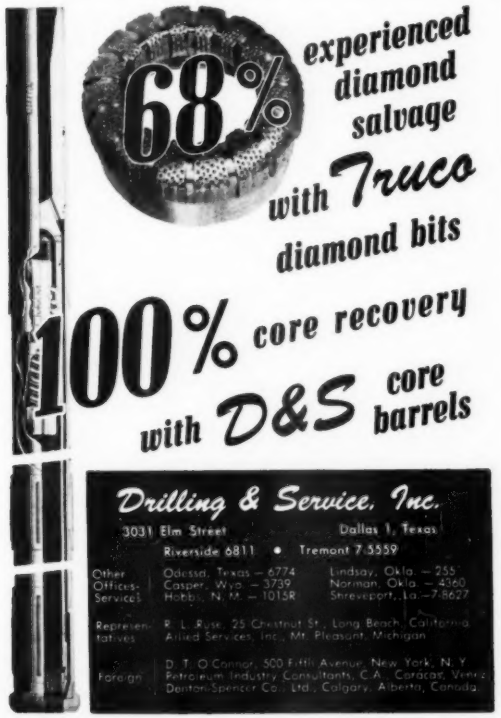
Yolo County, Capay area: Amerada Petroleum Corp. 1 Capay Community 5, 36-10n-2w, dry, TD 4,047 ft., elev. 206 ft.

APPALACHIAN FIELD

Directional Survey Being Made in Fayette County

PITTSBURGH.—In Wharton Township, Fayette County, Pennsylvania, William E. Snee et al No. 3 Indian Creek Coal & Coke Co., elevation 2,615 ft., recorded the Chert at 7,012 ft. The well is shut down and a directional survey is being made. The Tully in this well was at 6,326-6,410 ft. Georges Township, Orville Eberly et al No. 1 N. E. Murphy, elevation 2,560 ft., is drilling at 6,356 ft. Napier Township, Bedford County, South Penn et al-Snee & Eberly No. 1 Jesse B. Miller, elevation 1,666 ft., is shut down at a depth of 5,470 ft. Croyle Township, Cambria County, Peoples Natural Gas Co. No. 1-3878 Joseph Gavany is drilling at 2,319 ft.

One new location was reported in South-



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west Pennsylvania in West Finley Township, Washington County.

Clay District, Hancock County, West Virginia, John T. Galey No. 1 Karol and Catherine Sobel is drilling at 3,600 ft. Portland District, Preston County, Hope Natural Gas Co. No. 9301 John and Edna Murphy is again drilling and it at a depth of 4,000 ft. Dry Fork District, Tucker County, Cumberland & Allegheny Gas Co. No. 1-A-425 Jason Harman is drilling at 6,980 ft.

Fifteen new location were reported in West Virginia: Otter District, Braxton County; Cross Creek District, Brooke County; DeKalb District, Gilmer County; Grant, Ravenswood, Union and Washington districts, Jackson County; Collins Settlement and Hackers Creek districts, Lewis County; Harts Creek District, Lincoln County; Lincoln District, Marion County; Browns Creek District, McDowell County; Harvey District, Mingo County; Teays Valley District, Putnam County; and Murphy District, Ritchie County.

KANSAS

Ellis County Wildcat To Test Arbuckle Pay

ANOTHER producing area about 2 miles southeast of the recently opened Dreiling pool, in southwestern Ellis County, appears to have been found by M. B. Armer in his 1 Kuntz, NW NW NE 35-14-16, which is preparing to test showings found in the Arbuckle, topped at 3,331 ft. (—1,502 ft.), with rotary hole drilled at 3,335 ft., casing has been cemented 1 ft. in the top.

Some showings also were found in the Lansing-Kansas City, topped at 3,077 ft. (—1,248 ft.). In a drill-stem test of this zone at 3,078-3,122 ft., 120 ft. of muddy oil and 90 ft. of oil-cut mud was recovered. Scattered stainings were logged through the zone to 3,263 ft.

Loomis and associates 1 Atkinson, SW SW NE 15-17-5e, new pool opener in Morris County, has been given a pump potential rating of 40 bbl. per day. Pay zone is at 2,236-57 ft. Nearest production is in the Nelson pool, 2 miles to the southwest, and the Lost Springs pool, 3 miles west.

In Rooks County, Shell Oil Co. 1 Stamper, SE NW SE 28-8-17, 2 miles east of the Dopita pool, is being put on the pump after swabbing tests. With casing perforated at 3,394-3,408 ft., it swabbed 1½ bbl. of oil and 2 bbl. of water per hour after acidizing with 1,000 gal. With an additional 2,000 gal. of acid, it swabbed 1¼ bbl. of oil and 1¾ bbl. of water per hour. Total depth is 3,529 ft., with Arbuckle topped at 3,456 ft., and casing at 3,528 ft.

Heathman Drilling Co. 2 Selina-Veatch, SW NW NE 9-10-20, ½ mile southwest of the Palco pool, Rooks County, has casing run to 3,795 ft. in Arbuckle lime, topped at 3,793 ft. (—1,566 ft.), preparatory to testing showing encountered in that pay. Rotary hole was drilled to 3,796 ft.

KANSAS SUCCESSFUL WILDCAT

Barton County: Aladdin Petroleum and Crowe Drilling Co. 1 Kultgen, SW SW NW 12-19s-12w, 120 bbl. of oil per day from Arbuckle at 3,390-3,407 ft., TD.

KANSAS WILDCAT FAILURES

Barton County: Alpine & Sohio 1 Horejsi, NE NE NW 12-16s-11w, dry, TD 3,405 ft.
Phillips and Hanson 1 Hammeke, SE SE SE 7-19s-12w, dry, TD 3,477 ft.
Hinkle Oil Co. 1 Hagen, NE NE NE 34-20s-11w, dry, TD 3,321 ft.
Cowley County: Ryan Consolidated 1 Palmer, NW NE NE 22-34s-3e, dry, TD 3,286 ft.
Dickinson County: E. J. Tatge 1 Anna Daetwiler, SE SW SE 31-16s-4e, dry, TD 2,385 ft.
Ellis County: Blair et al., 1 Staab, NE NE NW 29-12s-17w, dry, TD 3,786 ft.
Virginia Drilling Co. 1 Schenck, NW NW NW 24-13s-19w, dry, TD 3,708 ft.
Virginia Drilling Co. 1 Miller, SE SE NW 18-13s-18w, dry, TD 3,851 ft.
Lyon County: Elk Petroleum Co. 1 Zink, NE NE NW 27-15s-10e, dry, TD 3,485 ft.
Reno County: Harry Gore 1 Collier, NE NE NW 22-23s-9w, dry, TD 4,115 ft.
Rice County: Continental Oil Co. 1 Patterson, NE NE SW 21-18s-8w, dry, TD 3,471 ft.
Rooks County: Cook-Galloway Petroleum Co. 1 Desaire, SW SW SE 32-8s-20w, dry, TD 3,769 ft.
Sedgwick County: J. P. Gaty 1 Wineteer, NE NE NW 9-28s-2e, dry, TD 3,292 ft.
Wabaunsee County: Waugh Brothers and Landon 1 Martin, SE SE NE 34-13s-12e, dry, TD 3,270 ft.

MICHIGAN

New Pay Attempt in Buckeye Continues to Drill and Core

MOUNT PLEASANT.—Mogul Oil Co. B-1 Domokos, W½ SW NW 11-18n-1w, Buckeye Township, Gladwin County, the deeper horizon wildcat in the Buckeye Dundee oil pool, may be carried to the Sylvania sand before final completion. Original objective of this test was the Richfield at about 5,200 ft.

This week the well was being cored below 5,035 ft. The twelfth core to be cut since drilling reached 4,461 ft. It was believed that the test was through the Richfield zone, as it is known in other areas where it is producing oil and gas in the state. The eleventh core showed black lime, generally conceded to be the base of the Richfield.

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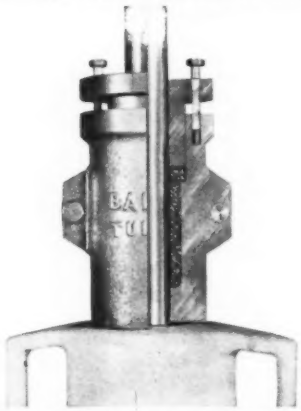

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showings in the 11 cores cut, but none appeared to be good enough to indicate commercial prospects. The last three shows reported were in the black lime section now being penetrated. The Sylvania sand section, if present in this wildcat, should come in within the next 250-300 ft.

Another interesting Richfield deep test in Gladwin County, Superior Oil Co. 1 Kenyon, NE NW SW 12-20n-1w, Butman Township, was being cored below 4,826 ft., still short of the objective. This well is just north of the one-well Butman Dundee producing area and generally considered to be the final hope of opening that district to commercial oil production. The 1 Kenyon was dry in the Dundee as were three other Dundee horizon tests that followed the discovery producer.

MICHIGAN WILDCAT FAILURES

Allegan County, Casco Township: Norman L. Stevens 1 Tourtellotte, SW NW SE 8-1n-16w, Traverse 1,134 ft., dry, TD 1,148 ft.

Isabella County, Deerfield Township: Sun Oil Co. 1 Quillen, NW SE SE 1-14n-5w, Dundee 3,741 ft., dry, TD 3,777 ft.

Kent County, Tyrone Township: James J. McGerry, Trustee 1 Anderson, NW NE SE 21-10n-12w, Traverse 2,362 ft., dry, TD 2,392 ft.

Midland County, Lee Township: C. W. Collin 1 Fall et al., SE NE NE 10-14n-1w, Dundee 3,633 ft., dry, TD 3,475 ft.

CANADIAN FIELDS

Ross Petroleums, Ltd., Gets Important Leduc Success

CALGARY.—Ross Petroleums, Ltd., Edmonton independent oil firm, obtained oil in the D3 zone of Devonian at its 2 Leduc that is situated on the west edge of the field. This important success could open up a whole new production area in the field. Further drilling in this region, however, will be necessary to determine the extent of the new find.

The test, LSD 10, 13-50-27w4, contacted the D3 at 5,201 ft. and ran a drill-stem test of the interval 5,201 ft. to bottom 5,220 ft. Oil flowed to the surface 11 minutes after valve was opened, and the natural gas flow was measured at 400,000 cu. ft. daily. Liner has been set to bottom and crew expects to gun perforate opposite the oil zone immediately and then run production tests. On the basis of the rest of the field it is believed that Ross-Leduc 2 has about 31 ft. of pay zone.

The company's initial success, located about ¼ mile east of the new well, found oil production in the D2 zone, however, the 2 Leduc found the D2 zone very tight and operator does not plan to drill in search of D2 production at that site. Both wells are situated on an Imperial Oil, Ltd., farmout quarter section obtained by Ross Petroleum earlier this fall.

Time Oils, Ltd., one of the active members of the Brown-Moyer-Brown group of Calgary independents, is slated to commence drilling immediately on an exploratory farmout in Central Alberta, about 14 miles due west of the Golden Spike-Leduc-Woodbend major oil reserves. The firm will test a nine-section farmout secured from the Texaco Exploration Co.-McColl-Frontenac Oil Co. team.

Time-Texaco-Brightbank 1, the test well, has been staked in LSD 4, 28-51-2w5, on the high of the seismograph-indicated feature covered by the farmout block. The well will probe the Cretaceous and Devonian formations to a total depth somewhere between 6,500 ft. and 6,800 ft.

Pacific Petroleums, Ltd., and associates have indicated oil success at their second stepout test 1½ miles west of the former northwest producing limits of Redwater field. The first indicated success came in recently when S.C.A.P.-Redwater 9-17C found oil in the D3 coral reef.

S.C.A.P.-Redwater 16-17C, the second test, was started immediately ¼ mile north of the initial well, in LSD 16, 17-58-22w4. The D3 zone was topped at 3,216 ft. and three drill-stem tests have been run to date. The first test, of interval 3,219-42 ft., had a pipe recovery of 2,560 ft. of gassy crude in 1 hour. After coring ahead, the second test from 3,242-53 ft. gave 1,870 ft. of oil in 1 hour. The third test, at 3,251-58 ft., recovered 1,200 ft. of oil in 1 hour. Water has not as yet shown, and coring and testing is being continued.

Imperial Oil, Ltd., placed three more wells on steady production at Redwater to give the field a total of 85 producers. The team of Pacific Petroleums, Ltd., Princess Petroleum, Ltd., and Calvan Petroleums, Ltd., placed its Princess-Redwater 16-25 on production. This is the group's first oil well drilled on a quarter section farmout from Imperial Oil, Ltd., located on the west central side of the field. Canadian Gulf Oil Co. successfully completed two more wells to boost its number of Redwater oil wells to 32.

One oil well obtained its initial production at Leduc this week, completed by Imperial Oil, Ltd., the discoverer of the field.

CANADIAN WILDCAT FAILURES

B.H.S.-Willson 1, LSD 14, 6-17-25w4, TD 8,510 ft.

Socony-North Branch 1, LSD 13, 3-2-19w4, TD 4,195 ft.

Imperial-Namao 1, LSD 12, 22-54-24w4, TD 5,188 ft.

British Dominion-Dawson Creek 1, LSD 12, 9-79-13w6, TD 2,525 ft.

Imperial-Plain Lake 1, LSD 1, 11-53-12w4, TD 6,437 ft.

Imperial-Bon Accord 1, LSD 7, 28-56-23w4, TD 3,865 ft.

ILLINOIS

Wabash County Wildcat Produces from Benoist

MATTOON.—Ashland Oil & Refining Co and associates are opening another new pool in Wabash County, and the first sand production for the general area, at their 1 Kortage, NW SE NW 21-1n-13w, where production tests are under way in Benoist sand at 2,513-24 ft. Placed on the pump, the well made 167 bbl. of clean oil in the first 24 hours, and 110 bbl. the second day. Total depth is 2,529 ft. Pay was shot with 20 qt.

The new area is about 3 miles south of Lancaster, and about 2 miles northwest of the Friendsville pool. A small, isolated McClosky lime well, the nearest production, is located about ¾ mile southwest in Section 20. Operators are starting a second test, a location south on the same lease, to confirm the discovery.

A third pay zone for the new area recently opened by R. A. Harris at the southeast end of the Lawrence pool, 4 miles south of Lawrenceville, Lawrence County, is being proved at Magnolia Petroleum Co. 1 Dining, SW NE NW 32-3n-10w, which pumped 83 bbl. of oil in the first 10 hours after acidizing with 1,000 gal. Pay is at 1,834-39 ft. This well is a north offset to the discovery well, R. A. Harris 1 Akin, producing from O'Hara lime at 1,883-1,901 ft., and an east offset to R. A. Harris 1 Leighty, producing from Cypress sand at 1,590-1,610 ft.

This area added another good producer the past week by the completion of R. A. Harris 1 Findley, SE NW SW 32-3n-11w, a southeast diagonal offset to the discovery well. It flowed at the rate of 300 bbl. per day from the O'Hara at 1,825-29 ft. Satu-

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ration also was found in the Cypress, opposite which an alloy section was run in the casing string, and which will be tested later.

The fourth and deeper pay zone, the Trenton lime, for the Assumption North pool, in Christian County, is in prospect at Harry Lippitt 3 Jones, NE NE SW 15-13n-1e, which is cleaning out to test this zone at 2,960-3,004 ft., after a 500-gal. acid treatment. The location is ½ mile east of production at the south end of the pool. Other pays in the pool are the Benoist sand at 1,050 ft.; the Rosiclare lime at 1,150 ft., and the Devonian lime at 2,300 ft.

ILLINOIS SUCCESSFUL WILDCAT

Morgan County: Murwood Oil & Gas Co. 1 Doolin-Carr, C S½ NE NE 16-13n-8w, IP 2,000,000 cu. ft. of gas, Silurian 1,042-60 ft., TD 1,103 ft.

ILLINOIS WILDCAT FAILURES

Clark County: Golden McNary 1 fee, SE NE SE 27-11n-14w, dry, TD 375 ft.
Clay County: Magnolia Petroleum Co. 1 Laughton, NW NW NE 24-4n-7e, dry, TD 3,083 ft.
Coles County: Ray Phillips 1 Goble, NE SE NE 9-13n-14w, dry, TD 350 ft.
Edgar County: Cooksey and English Oil Exploration Co. 1 Lange, NW NW NE 21-15n-3w, dry, TD 455 ft.
A. J. Holderman 1 Wood, NW NE SE 20-14n-13w, dry, TD 425 ft.
Nation Oil Co. 1 Childers, NE SE SE 21-13n-11w, dry, TD 1,090 ft.
C. E. Skiles 1 Templin, NE NW NW 24-13n-11w, dry, TD 1,005 ft.
S. R. Travis 1 Tolen, SE SW NW 26-13n-13w, dry, TD 536 ft.
C. E. Skiles 1 Clapp, NE SE SW 28-13n-13w, dry, TD 482 ft.
C. E. Skiles 1 McDavitt, NW NW SW 28-13n-13w, dry, TD 480 ft.
C. E. Skiles 1 Schneider, NW SW NE 29-13n-13w, dry, TD 460 ft.
Caro Oil & Gas Co. 1 Safford, NW NW NE 13-12n-11w, dry, TD 1,019 ft.
Effingham County: Paul Doran 1 Shumaker, NW NW SE 13-6n-4e, dry, TD 2,487 ft.
Franklin County: Stewart Oil Co. 1-B U. S. Coal & Coke, SW SW NW 26-6s-4e, dry, TD 3,313 ft.
Gallatin County: Capco Petroleum Co. 1 Wilson, NE SW NE 34-7s-9e, dry, TD 2,314 ft.
Jasper County: Keystone Oil Co. 1 Bail, NW SW NW 9-7n-9e, dry, TD 4,502 ft.
Jefferson County: C. R. Winn 1 Bogan, NW NW NW 7-1s-3e, dry, TD 2,538 ft.
J. W. Everhart 1 Kujawa, SW NE NE 18-3s-1e, dry, TD 2,351 ft.
Madison County: Carl Wilson 3 Engelke, NW NW NW 29-6n-6w, dry, TD 620 ft.
A. M. Foley 1 Noble, SW NE SE 27-6n-7w, dry, TD 600 ft.
Montgomery County: C. V. Mount 1 Lane, SE SE SE 28-9n-4w, dry, TD 849 ft.
Richland County: R. B. Martin 1 Arnold, NE NE SE 14-2n-10e, dry, TD 3,350 ft.
Wayne County: H. H. Weinert 1 Mann, SE SE SW 12-2s-7e, dry, TD 3,415 ft.
Williamson County: Amerada Petroleum Corp. 1 Gent, SW NW SE 33-8s-4e, dry, TD 2,832 ft.
Winnebago County: Ivan Seele 1 Seele, SW NW NW 24-44n-2e, dry, TD 370 ft.

PERMIAN BASIN

Peak Not Yet Reached in Scurry County Activity

MIDLAND.—Scurry County reef drilling continues to hold the interest of Permian Basin operators, and with approximately 140 drilling wells at this time, the peak is yet to be reached, according to most observers. The few dry holes in the entire area have not yet defined the structure, and the "pinched out" areas which many operators said were to be expected as typical reef structure, have been conspicuous by their absence.

On the southeast edge of the North Snyder field, Johnston & Johnston 1 Una Hart Wade, 467 ft. from north and west lines, south half, 159-3-H&GN, completed for a daily potential of 2,535 bbl. of 43°-gravity oil, through ¾-in. choke. On elevation of 2,431 ft., ground, it had top of reef at 6,545 ft., and top of pay at 6,685 ft. Tubing pressure was 500 psi., casing pressure 1,100 psi and gas-oil ratio was 880 cu. ft.

Placid Oil Co. staked location for a 1-mile southwest outpost to the North Snyder field, as the 1 C. E. Ferguson, 467 ft. from north and east lines, northwest quarter, 295-97-H&TC. Elevation is 2,388 ft.

Hiawatha Oil & Gas Co. was said to have made tentative location for a test 1½ miles south of Placid's 1 Ferguson, which would place it about 1 mile northwest of the Wilkirson sector. It was to be the 1 Lewis, SW NE 294-97-H&TC.

Placid 1 R. H. Odom, 388-97-H&TC, wildcat east of the North Snyder field, completed for 5 bbl. of 36°-gravity oil a day, from Strawn pay topped at 7,713 ft.

William Hamm, Jr., and Jones & Simpson Drilling Co., Dallas, prepared to move in to drill their 1 Dee Myers, SE SW 244-97-H&TC. Location is 2 miles west of the S. B. Roberts 1 Lewis, and 1½ miles north of Diamond-M producers. Jones & Simpson were said to have an interest in the well in addition to being contractors on the test.

Northwest of Snyder, Westbrook Oil Co., Fort Worth, staked a southwest offset to Standard-Fryer 1 York, recently completed extension well. The new location is for 1 Etta M. Worley, 467 ft. from north and 853 ft. from east lines, south half, southeast quarter, Tract 35, Section 15, Block 1, J. P Smith Survey.

Seven miles northeast of Snyder, M. E. Davis and J. C. Miles 1-A Schattel, 90-2-H&TC, was drilling ahead below 7,653 ft. in hard lime. A 1-hour drill-stem test at 6,935-51 ft. produced a slight blow for 16 minutes and recovered 6 ft. of very slightly

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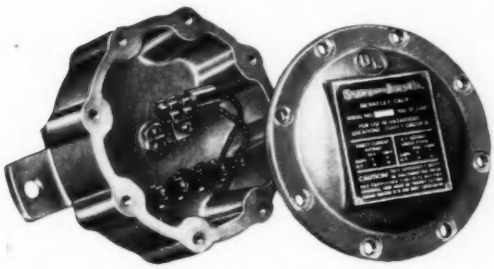

The S. & J. Level Alarm shown above is listed by Underwriters Laboratories for use in Class 1, Group D, hazardous locations. The body of this explosion-proof switch box is of cast aluminum with threaded hub to accommodate stainless steel operating shaft. Another threaded outlet is provided in the bottom for conduit connection. One mercury switch is provided as standard equipment, a second switch may be added at extra cost, as box will accommodate two switches with terminal blocks.

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This alarm is available in two types: The Fully Automatic (Figure ST-5230A) will continually repeat its alarms until the condition causing the continual tripping is corrected. The Manual Reset Type (Figure ST-5230M) requires manual resetting after having tripped, thus assuring the opportunity of determining each cause of tripping. The bodies of these level alarms are of cast steel, designed for 300 pound service. All trim is of stainless steel. Both types are equipped with Mercury Switches enclosed in the explosion-proof switch boxes illustrated at the left.

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oil-cut drilling mud. According to reports, the well is checking about 100 ft. low to Placid Oil Co. 1 Early. At 7,653 ft. it was expected to be near the lower Strawn.

In the north end of the Kelly area, Wilshire Oil Co. 1 E. C. Rinehart, 251-97-H&TC, reported a flow of some 1,200 bbl. of fluid while cleaning and testing on various size chokes in 11½ hours. Total depth was 6,700 ft. During the last hour it made 160 bbl. of oil through 1-in. choke.

George P. Livermore 1 H. Winston, 1 mile east of Kelly field production, approximately SE SE Tract 69, 11-1-J. P. Smith Survey, topped the Strawn at 7,400 ft., and drilled to 7,432 ft. A 90-minute test of the section recovered 480 ft. of heavily oil and gas-cut mud, plus 90 ft. of heavily gas-cut and slightly oil-cut mud. Operators drilled to 7,491 ft., and ran a 2½-hour test from 7,461-91 ft., which recovered 2,000 ft. of clean, 43°-gravity oil, of which the bottom 240 ft. was slightly mud cut. At last report it was running casing to complete in the Strawn. Elevation was not reported. It was said to have found the reef low and without shows.

Tom Green County.—C. L. Norsworthy, Jr., 1 W. C. Jones, 38-24-H&TC, wildcat in the southern part of the county, prepared to plug as an Ellenburger failure but found an indicated reef section on electrical survey, and was resurveying to test. A drill-stem test from 5,980-6,005 ft., total depth, recovered 280 ft. of mud with no shows. Following that the survey indicated the reef at 5,250 ft., which was said to be 214 ft. high to Phillips 1 Weddell, small pumper 3 miles south and slightly east, in Schleicher County.

Borden County.—Amerada Petroleum Corp. 1 N. C. Von Roeder, 103-25-H&TC, 4 miles west of reef production in Scurry County, recovered mud and water on a 4-hour test from 6,910-35 ft. A second test from 7,095-7,135 ft. showed gas in 3 minutes and flowing oil in 11 minutes, and in 4 hours it flowed 145 bbl. of fluid, being mostly 41°-gravity oil. Bottom-hole flowing pressure was 1,250 psi. The drill pipe unloaded 4,640 ft. of oil, and recovery was 273 ft. of salt water. The oil was believed to be coming from the reef, topped at 6,835 ft., which is about 100 ft. low to nearest reef producers. Elevation is 2,368 ft. It was drilling ahead below 7,334 ft., on a 7,500-ft. contract.

Terry County.—Tide Water Associated Oil Co. 1 J. P. Nystel, 9-C38-PSL, prospective discovery 4 miles northeast of the Adair field, recovered 1,065 ft. of water blanket heavily oil and gas-cut, and 1,222 ft. of free oil on a 2-hour test from 11,469-645 ft., which was thought to be the Devonian. It drilled ahead, then cored from 11,570-595 ft. and recovered 25 ft. of porous lime. A 4-hour and 15-minute test from 11,511-595 ft., using 1,030 ft. of water blanket, produced a good blow throughout and recovered 1,122 ft. of gas in drill pipe, 2,350 ft. of clean 35°-gravity oil, and 1,030 ft. of heavily oil and gas-cut water blanket. Bottom-hole flowing pressure was 700-1,500 psi. It was to core ahead 45 ft. and run another test.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Crane County: B. L. McFarland 1 W. E. Connell estate, SW SW 15-B22-PSL, 1½ 1½ mi. N C-Bar field, dry, TD 3,600 ft., San Andres 3,430 ft., Grayburg 3,250 ft.

Crockett County: R. J. St. Germain and Gar-Ter Drilling Co. 1 Gulf-Chambers, Blk. 4, Chambers CSL, 1½ mi. N Vaughn field, dry, TD 1,520 ft., elevation 2,635 ft., top lime 1,400 ft.

Humble Oil & Refining Co. 2 J. A. Harvick, SW NW 100-GH-GC&SF, 6 mi. N Ozona, 1½ mi. W 1 Harvick, dry, TD 9,500 ft., elevation 2,522 ft., San Andres 1,030 ft. Ellenburger 8,393 ft., had trace of oil 8,405-55 ft.

Moore Exploration Co. 1-I Shannon, approximately SW SW 21-YZ-ELRR, NW part of county, 17 mi. E Iraan, 1 mi. E shallow production, dry, TD 8,010 ft., dolomite, elevation 2,571 ft., Strawn 6,750 ft., Ellenburger 7,760 ft.

Culberson County: R. H. Smithpeter 2 W. A. Scott, 23-114-PSL, 1½ mi. E 1 Scott, dry, TD 1,935 ft. in sand, elevation 3,674 ft., Delaware 1,855 ft.

Dawson County: Seaboard Oil Co. 1 Mart Barrow, SW SE 8-35-T6N-T&P, 3½ mi. NE Lamesa, dry, TD 11,639 ft., PB 4,374 ft., elevation 3,017 ft., anhydrite 1,915 ft., Yates 2,545 ft., San Andres 4,010 ft., Sprayberry 7,145 ft., Reef 9,035 ft., Mississippian 10,735 ft., Woodford 11,065 ft., Devonian 11,135 ft., Fusselman 11,244 ft., Montoya 11,300 ft., Ellenburger 11,455 ft.

Pecos County: Copeteo Corp. 1 H. K. Hinde heirs, Sec. 26-178-TCRR, 19 mi. NW Sheffield, 2 mi. S production in Yates field, dry, TD 2,129 ft., elevation 2,537 ft., show of oil in Grayburg 1,840 ft.

L. E. Edwards 1 G. R. White, 18-Z-TCRR, 3 mi. NE White and Baker field, dry, TD 1,910 ft., elevation 2,710 ft., San Andres 1,852 ft.

Val Verde County: Robinson, Yoas, King & Parker 1 Mrs. Martha Harrison, Sec. 31, Blk. L, GC&SF, dry, TD 1,185 ft., elevation 1,775 ft.

OHIO, KENTUCKY

Preston Oil Completes Good Clinton Producer

COLUMBUS.—A large producer was completed by Preston Oil Co. in Baker pool on 3 H. C. Albert, Section 34, Hopewell Township, Perry County. The Clinton sand at 2,881-2,923 ft. filled up 1,500 ft. in 4 hours, and flowed 260 bbl. in the first 24-hour test after shot. A mile to the west, Wasson Co.'s 2 Adam Fisher, Section 32, found the Clinton at 2,948-75 ft. with 325,000 cu. ft. of gas, natural, which will be shot and tubed.

In Deavertown pool, Foraker Drilling Co. and Sidwell 2-C John Sipos, Section 36, York Township, Morgan County, drilled through a thick Clinton formation with a good showing of oil. The hole filled 3,000 ft. in 12 hours and will be shot with 100 qt. or better.

H. E. Perkins 3 Aurilla Wagner, Lot 7, Monroe Township, Knox County, logged the Clinton at 2,465-77 ft. and gaged 400,000 cu. ft. of gas natural.

Two wildcats have been started in Tuscarawas County. A. C. Marsh is drilling on W. E. Wolf in Section 5, York Township, and Stone Creek Brick Co. found the Berea dry and is going to the Clinton on C. Snyder in Lot 3, Jefferson Township.

WESTERN KENTUCKY

OWENSBORO.—Following swabbing tests which virtually assured production from both the Palestine and Hardinsburg sands, Iley B. Browning 1 Osborn heirs, NE SW SE 13-N-23, ¾ mile south of the most southerly limits of the Poole Consolidated pool, Webster County, is now being placed on the pump for completion.

Testing the Hardinsburg sand at 2,004-20 ft., the well swabbed 2 bbl. of oil per hour. The alloy section in the casing string opposite the Palestine sand at 1,625-31 ft., then was perforated, and with a plug set to shut off the Hardinsburg, the well swabbed 1½ bbl. per hour. On the pump, the well is expected to make about 90 bbl. per day from both pays.

George & Wrather and Ryan Oil Co. have completed their 1 McCann, SE NW SW 18-N-28, which opens a new area about a mile north of Glenville, in Daviess County. On the pump it made better than 3 bbl. of oil per day, with production from O'Hara lime at 1,870-75 ft. On previous swabbing tests, it made about 3 bbl. per hour.

Delta Drilling Co. has added another in a succession of good wells which have been completed in the new Caney Mound pool, in 13-P-20, Union County. Its 6 Walker Heirs, 900 ft. of No. 3, pumped and flowed 357 bbl. per day from the pool's O'Hara lime pay zone at 2,522-38 ft. Sinclair Oil & Gas Co. 2 Ohio Valley, 1,000 ft. east of No. 1, on the northeast side of the area, also looks like another good well. Swabbing, with pay at 2,536-50 ft., it made 180 bbl. in the first 8 hours.

WESTERN KENTUCKY SUCCESSFUL WILDCAT

Daviess County: George & Wrather et al 1 McCann, SE NW SW 18-N-28, IP 3 bbl., McClosky 1,870-74 ft., TD 1,878 ft., (Opens new pool.)

WESTERN KENTUCKY WILDCAT FAILURE

Henderson County: Kingwood Oil Co. 1 Smith-Krahwinkel, NW NW NW 24-Q-27, dry, TD 1,379 ft.

EASTERN KENTUCKY

ASHLAND.—The wildcat test of Arch Carpenter et al located in 25-X-78 and 10 miles northwest of Grayson, the county seat, was reported testing a show of oil in the St. Peter sand at 3,600 ft. after plugging back from 3,840 ft. in the Knox dolomite, which carried water. Well has been shot with 200 qt. and operators continue cleaning out and testing.

In Ledford pool along the Wolfe and Powell county line recent completion was made at Charles Ledford 8 Ledford-White-Tidwell Tract 1 making 65 bbl. oil in 6 hours. Further south E. B. Martindale has made location for 1 Ledford-White-Tidwell Tract 12A. Production in this area is from the Corniferous lime at a depth of approximately 1,200 ft.

In the Big Sandy gas field and located in Floyd County, Kentucky, West Virginia Gas Co. recently completed 943 Florence Hereford at a total depth of 1,315 ft. for 520,000 cu. ft. of gas daily from the Big Lime (Mississippian).

EASTERN KENTUCKY WILDCAT FAILURE

Owsley County: Petroleum Exploration 3 Burgoyne Botner, 9-L-69, dry, TD 3,784 ft., Big Lime 542 ft., Brown shale 1,000 ft., Corniferous 1,230 ft., Tyrone 2,591 ft., St. Peter 3,459 ft., Knox 3,784 ft., water.

INDIANA

EVANSVILLE.—Ryan Oil Co. 1 Egli, NE SE NE 18-6s-12w, located 6 miles northeast of Mt. Vernon, Posey County, in the area between the Caborne and Bufkin pools, and a mile from nearest production, is giving indications of making a well. With casing run, it now is cleaning out to test Cypress sand at 2,373-84 ft., in which a drill-stem test resulted in a recovery of 600 ft. of clean oil. It also had saturation in the Mansfield sand at 1,253-68 ft., in which a drill-stem test got 30 ft. of oil plus about 300 ft. of water.

About a mile to the northwest and ½ mile south of production in the Bufkin pool, C. E. Skiles is testing Mansfield sand in his 1 Meier, SE NE SW 7-6s-12w. In the first 24 hours, the well swabbed 120 bbl. of clean oil. Pay is at 1,120-40 ft., with 5½-in. casing on top.

A mile east of the Bufkin pool, in the shallow Oliver gas area, where the above operator has a prospective oil producer in both the Mansfield sand and the O'Hara lime, testing has been delayed by collapsed pipe. The well, 2 Ray Woelker, NE SW SW 1-6s-13w, swabbed 1½ bbl. of oil per hour when testing the O'Hara at 2,754-59 ft. Later, after removing the alloy section in the casing string opposite the Mansfield at 1,235-44 ft., pipe collapsed and hole filled with water. Gas production in the area is from Pennsylvanian sand around 600 ft.

INDIANA WILDCAT FAILURES

Greene County: C. E. Skiles 1 McDermott, NW SW SW 33-8n-5w, dry, TD 2,615 ft.

Posey County: George & Wrather 1 Cox & Campbell, NE SE NE 35-5s-13w, dry, TD 2,965 ft.

Warrick County: Texas-Indiana Oil Co. 1 Tennison, SW NW NW 27-6s-8w, dry, TD 1,910 ft.

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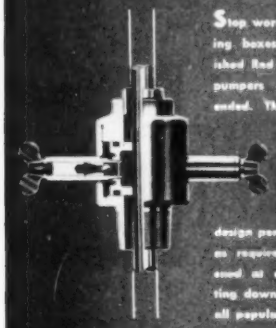

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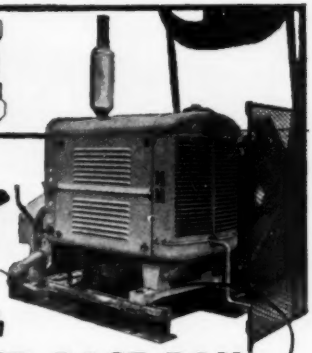

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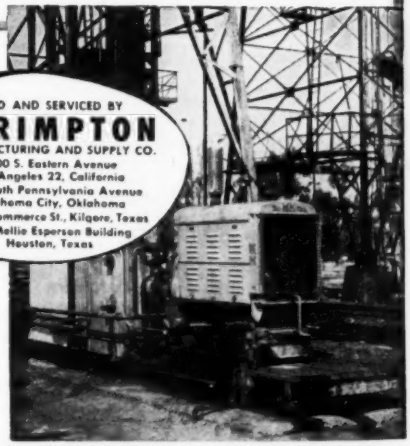

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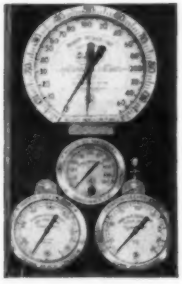
MINNEAPOLIS-MOLINE

MINNEAPOLIS 1, MINNESOTA

There's a Clipper "Sealtite" for every drilling control need!

The Clipper *"Sealtite"*
Weight Indicator and Drilling Control Instrument provides all the important drilling factors not just weight alone



Clipper "Sealtite" installed in small floor space.

The Clipper "Sealtite" is so compact that it is easily transported.

THE CLIPPER "SEALTITE" Weight Indicator and Drilling Control Instrument provides the driller with information on all of the important drilling factors—not just weight alone.

An instrument which reliably shows weight, mud pressure, torque and rotary table speed, assembled in a small compact package for jackknife derricks, masts and derricks with limited floor space.

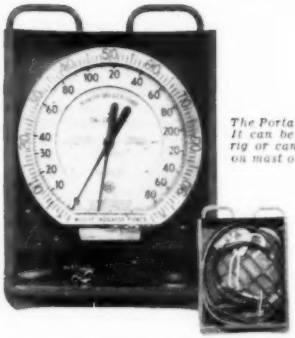
It has all the flexibility of a Toolpusher Model but gauges are not subjected to the violent whip and vibration of the dead line.

You can install or move a Clipper "Sealtite" just as quickly and easily as a Toolpusher type and it will last much longer.

Made in a wide variety of combinations...there is a Clipper "Sealtite" available for every purpose.

- **It's Tough**
- **It's Sensitive**
- **It's Compact & Complete**
- **It's Modern**
- **It's Movable**
- **It's Sealed**

The Clipper *"Sealtite"*
Production Model WEIGHT INDICATOR provides accuracy, sensitivity, and ruggedness for small rigs



The Portable Model is 14" x 17" x 12". It can be easily moved from rig to rig or can be mounted permanently on mast or derrick if desired.

Back view shows "Sealtite" construction, hi-pressure hose.

A Martin-Decker Production Model Weight Indicator Gauge can be placed anywhere you want it—at the brake, in front of the driller, over next to the line permanently attached to the mast where it can be seen by the driller—without danger or damage from dead line vibration or whip, and with it you can read your loads with precision in pounds. Equipped with supersensitive Vernier for maximum sensitivity and readability. Vacuum loaded at the factory and permanently sealed. Easy to install and move. No adjusting, no pumping and no moving problems—just leave it installed on the mast.

A Portable Model Clipper "Sealtite" installed on Ideco H-40 rig. Portable models are ideal for any small space.

The Portable Model Clipper "Sealtite" is so light and compact that it can easily be moved. Note convenience of handles.

- **Rugged and Dependable**
- **Keeps Gauge Off Dead Line**
- **Permanent Installation**
- **Easy Visibility**
- **Eliminates Effect of Dead Line Whip**
- **Lasts Longer**

HOME OF THE WEIGHT INDICATOR

MARTIN DECKER CORP.

LONG BEACH, CALIFORNIA

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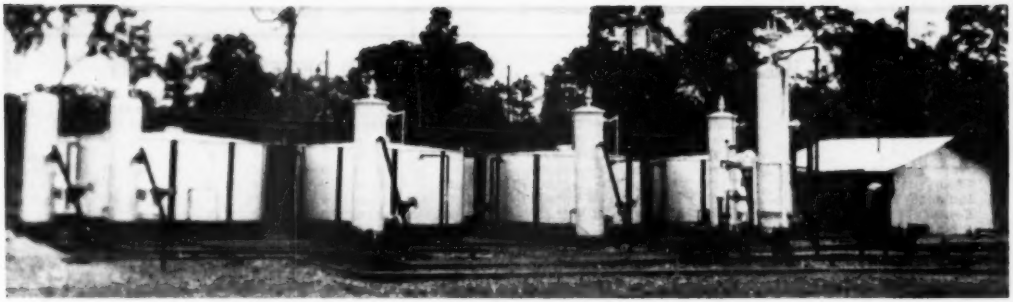


Storage battery and separators of United British Oilfields of Trinidad, Ltd., at Point Fortin, Trinidad. U.B.O.T. has a refinery here

Trinidad Problem

(Continued from page 54)

footage drilled also show the level of activity in the Trinidad industry. During the first 6 months of this year, 23 rigs were in operation, one more than in the same period last year. Footage the first half of 1949 totaled 296,375 ft. The total was 321,871 ft. the first half of 1948.

Assuming a similar footage the second half of this year, the 1949 total in Trinidad will be about 593,000 ft. Prewar, the Trinidad industry in 1940 drilled well over a million feet of hole. This fell off sharply during the war, and in 1947 was back up to 644,689 ft. The 1948 total was 638,681 ft.

Trinidad is one of the oldest producing areas in South America. Guayaguayare field was discovered in 1902 and is still producing about 1,000 bbl. daily. Only one field of consequence has been discovered since 1938.

Fields being depleted.—The gradual depletion of these older areas explains the declining per well production and increasing proportion on pump. The trend of per well output rose steadily until 1940 when it reached 41 bbl. daily. It has been dropping since. The percentage of flowing wells also has been declining since reaching a high of slightly more than 70 per cent in 1943.

In his annual report for 1948 Foster pointed out that the situation can only be relieved by successful exploratory drilling. Besides the steady fall in the average daily production per producing well, he called attention to the increase in salt-water production in Trinidad's wells which is due to updip movement of edge water and is a normal feature of aging reservoirs.

The Trinidad operating companies, almost wholly British controlled, are looking especially to deeper drilling as the means of maintaining and building up reserves. All of Trinidad's oil comes from the Tertiary, mostly from the Miocene, and the trend is toward testing of the deeper Tertiary formations and possibly the Cretaceous.

The present producing fields are concentrated in the southwest corner of the island. Geophysical work is being carried out in other sections, and in addition there has for several years been discussion of drilling in marine areas.

Marine drilling.—Some of Trinidad's fields extend down to the water's edge, and the possibility of offshore production is considered to be good. There have been indications this may be undertaken as a joint project of several companies. In his report for 1948, however, Foster said no deep-water exploratory drilling is expected before 1952, since it is most unlikely that the very expensive equipment required will be available before then. He added a few marine locations near existing fields may be drilled during 1950.

The exploration being carried out in Trinidad in the lower horizons was discussed in the recent report of National Mining Corp., Ltd. The company said its efforts this year had not been successful but that the possibility had by no means been ruled out.

The company reported it had drilled a well on the Otaheite estate to 12,161 ft. with negative results. The hole, it said, is believed to be the deepest thus far in Trinidad. Another well by its associated company, Trinidad Consolidated Oilfields, Ltd., was lost at 8,900 ft. The company commented that its experience was not unique and that other operators in Trinidad had had similar results.

Another recent company report, that of Trinidad Petroleum Development Co., Ltd., said it was preparing to extend its exploratory work to the Moruga district.

Refinery improvement.—A recent development of considerable interest in Trinidad was the announcement by Trinidad Leaseholds, Ltd., of plans for a $17,500,000 improvement program for its refinery at Pointe-a-Pierre. A press report from Port of Spain said the British Government has been asked to give its approval to the project. The refinery now has a capacity of 65,000 bbl. daily with 50,000 bbl. daily cracking. The new work calls for catalytic cracking, with Foster Wheeler, Ltd., handling the project.

It was said that the extension of the refinery will allow the refining of additional oil discovered in the present $13,000,000 exploration program of the Trinidad industry and also permit the expansion of refining of imported crude.

The imported crude referred to comes from Venezuela, and the background of this undertaking was explained in the Foster report. He pointed out that Trinidad had a duty in imported crude but had in the past permitted crude and charging stocks to be imported free of duty for limited periods from time to time.

At the end of the war, Trinidad's refining capacity was considerably in excess of domestic production, and consequently the government granted several applications by Trinidad Leaseholds to import free of duty. At the end of 1948, these altogether covered an average of 1,100,000 bbl. a month.

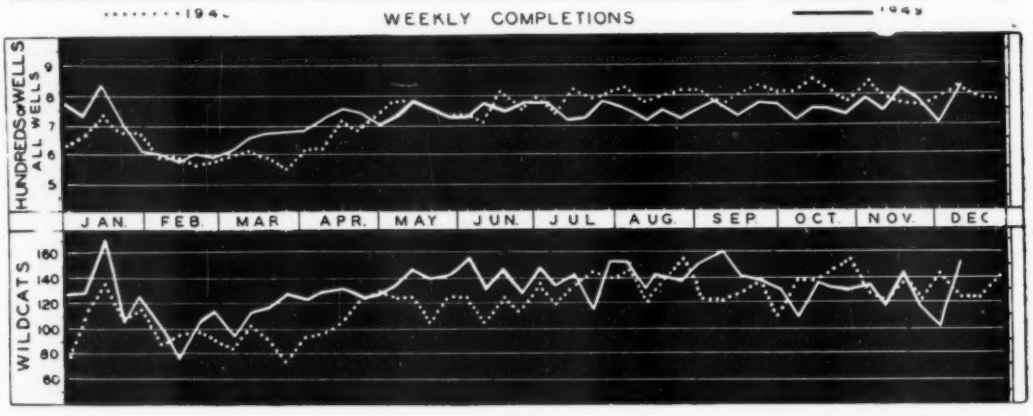
Duty-free crude.—The company's refinery expansion, Foster explained, was justified only on assurances of a supply of raw material over a long term, and furthermore, the local asphaltic crudes were not suitable for the economic manufacture of a full range of products.

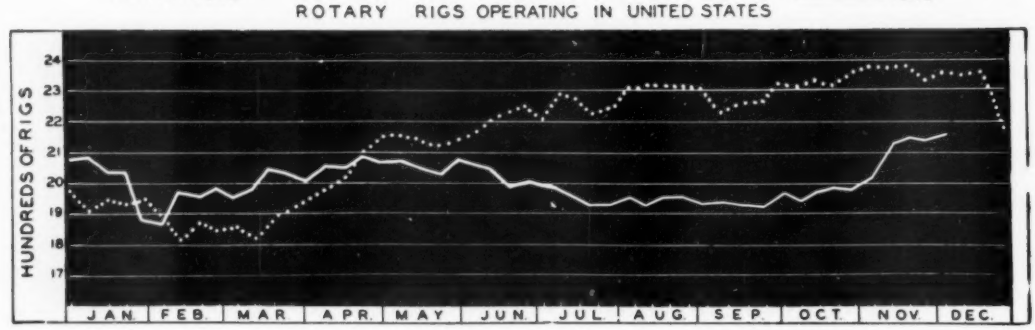
As a result, Trinidad Leaseholds was granted a 25-year permit for the duty-free importation of crude or charging and blending stocks to enable the company to maintain its refinery at full capacity. This permit was granted subject to several conditions. Among them were that the company would make every reasonable effort to maintain and increase its own indigenous production; buy indigenous crude offered on certain terms, maintain an average of one rig for exploration work during the first 8 years of the permit, and undertake to buy the government's royalty oil derived from company leases.

WEEKLY WELL COMPLETIONS . . WEEK ENDED DECEMBER 10, 1949

	Total of all wells					Dec. 10		Wildcat completions and discoveries					Cumulative total, 1949				
	Comp.	Oil	Gas	Dry	Footage	1949	1948	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	11	6	0	*5	16,010	703	1,406	0	0	0	0	0	0	0	1	0	1
Pennsylvania	22	6	5	†11	10,346	1,754	2,404	0	0	0	0	0	0	0	4	2	6
West Virginia	9	2	7	0	20,232	483	783	0	0	0	0	0	1	0	12	11	24
Ohio	21	5	9	7	37,015	1,028	1,527	0	0	0	0	0	2	0	2	29	33
Indiana	28	11	0	17	51,819	1,232	1,056	0	0	0	3	3	34	0	4	215	253
Kentucky	31	22	0	9	44,117	980	754	1	0	0	2	3	28	0	0	75	103
Illinois	79	32	1	‡46	155,154	2,608	2,386	0	0	1	25	26	62	0	3	468	533
Michigan	12	5	0	7	27,199	941	336	0	0	0	4	4	27	0	3	289	319
Kansas	74	29	12	33	231,474	3,114	2,985	1	0	0	14	15	71	0	9	393	473
Neb., Mo., Iowa	0	0	0	0	0	31	9	0	0	0	0	0	2	0	0	17	19
Oklahoma	92	53	4	‡35	313,543	4,071	3,200	2	2	0	13	17	134	15	16	574	739
Texas	338	234	14	90	1,443,116	12,425	11,419	13	1	3	46	63	379	42	110	2,108	2,639
North Central (Dist. 7-B & 9)	103	58	1	§44	298,832	4,165	5,585	6	0	0	20	26	172	0	19	840	1,031
West (Dist. 7-C & 8)	90	77	2	11	434,685	3,045	3,050	0	0	0	9	9	57	1	6	257	321
Panhandle (Dist. 10)	21	15	3	3	62,348	905	623	0	0	0	0	0	1	0	1	9	11
Eastern (Dist. 5, 6, & 6-P)	35	31	2	2	169,489	749	579	1	0	1	1	3	12	4	4	145	165
Gulf Coast (Dist. 2 & 3)	49	25	6	18	324,906	1,822	1,791	3	0	2	9	14	76	29	46	353	504
Southwest (Dist. 1 & 4)	40	28	0	12	157,856	1,739	1,821	3	1	0	7	11	61	6	34	504	607
Louisiana	50	32	6	12	255,302	2,145	2,203	0	2	0	5	7	52	20	4	193	269
Northern	34	23	6	5	107,982	1,298	1,478	0	1	0	1	2	5	3	0	92	100
Southern	16	9	0	7	147,320	847	731	0	1	0	4	5	47	17	4	101	169
Arkansas	5	3	0	2	17,448	304	293	0	0	0	1	1	3	0	1	65	99
Mississippi	5	4	0	1	35,071	314	401	1	0	0	1	2	6	2	1	99	108
Southeastern States	3	1	0	2	11,853	45	51	0	0	0	2	2	1	0	0	36	37
Montana	0	0	0	0	0	263	300	0	0	0	0	0	4	0	2	31	37
Wyoming	7	4	0	3	30,870	563	554	0	0	0	2	2	23	0	1	110	134
Colorado-Utah	2	0	0	2	10,689	130	211	0	0	0	2	2	2	0	0	65	67
New Mexico	6	4	1	1	23,492	466	564	0	0	0	0	0	13	1	2	48	64
California	40	32	1	7	152,851	2,454	2,721	1	0	0	5	6	36	0	7	423	466
Dakotas	0	0	0	0	0	18	2	0	0	0	0	0	0	0	0	15	15
Total United States	835	485	60	290	2,932,601	36,072	36,691	19	5	4	125	153	880	80	182	5,266	6,408
Total previous week	702	404	50	248	2,411,483			9	1	0	92	102	861	75	178	5,141	6,255
Total December 11, 1948	833	461	63	309	2,975,195			15	3	4	105	127	826	73	232	4,824	5,955

Service wells included: *5, †9, ‡1, §2.





DAILY AVERAGE PRODUCTION FOR WEEK

	Dec. 10 crude oil	B. of M. Nov. demand	Dec. 3 crude oil
Alabama	1,350	1,200	1,350
Arkansas	74,650	85,000	73,650
California	867,300	850,000	866,700
Colorado	60,200	73,000	62,750
Eastern	56,000	60,900	54,200
Florida	775	1,000	500
Illinois	179,200	185,000	172,600
Indiana	28,600	29,000	27,900
Kansas	281,250	302,000	294,200
Kentucky	26,400	23,000	24,900
Louisiana	536,800	550,000	533,850
North Louisiana	121,200		120,650
South Louisiana	415,600		413,200
Michigan	42,900	45,000	46,100
Mississippi	93,250	108,000	96,000
Montana	25,900	25,000	26,000
Nebraska	1,350	700	1,300
New Mexico	131,800	138,000	132,425
Oklahoma	407,100	415,000	416,750
Texas	1,976,700	2,230,000	2,088,525
Dist. 1 (Southwest)	26,000		26,750
Dist. 2 (Southwest)	116,625		125,650
Dist. 4 (Southwest)	185,825		196,000
Dist. 3 (Gulf Coast)	366,775		386,300
Dist. 5 (Eastern)	33,800		35,950
Dist. 6 (Eastern)	83,900		83,975
East Texas field	236,000		257,325
Dist. 7-C (West)	51,075		53,500
Dist. 8 (West)	582,400		618,725
Dist. 7-B (W. Central)	61,375		32,400
Dist. 9 (N. Central)	140,525		142,500
Dist. 10 (Panhandle)	92,400		92,350
Utah	3,000	1,200	3,100
Wyoming	139,900	127,000	139,050
Total United States	*4,934,425	5,230,000	5,060,250
Change from prev. week, down	125,825		

Total U. S. production January 1-December 10 †1,746,517,735 bbl.
Same period last year (crude plus cond.) 1,904,361,610 bbl.

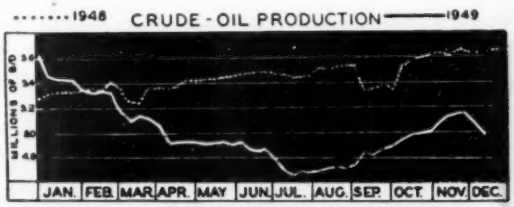
*Not incl. 82,445 bbl. condensate. †Incl. 28,221,600 bbl. condensate.

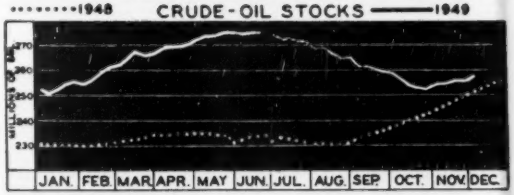
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

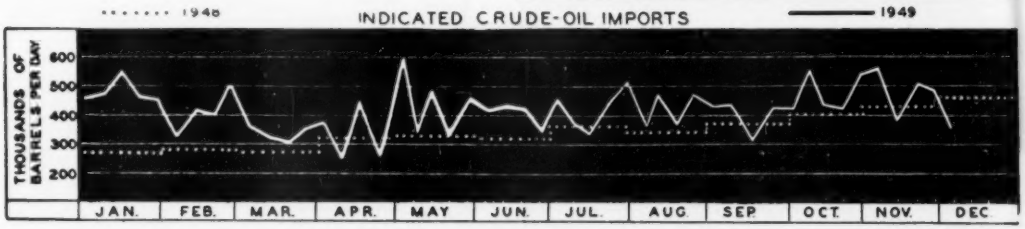
(Thousands of barrels)

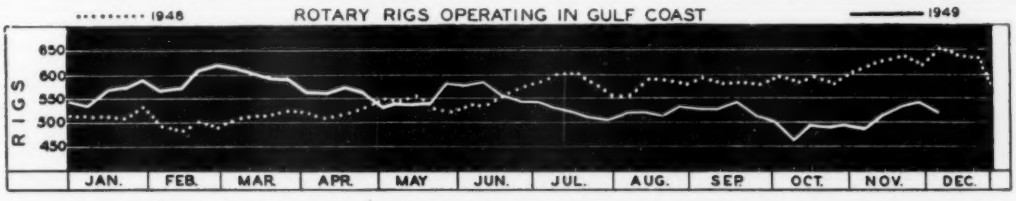
	Dec. 3, 1949	Nov. 26, 1949	Dec. 4, 1948
Pennsylvania Grade	2,973	3,031	2,903
Other Appalachian	2,014	1,865	1,389
Illinois, Indiana, Michigan	11,778	11,681	12,403
Arkansas	2,694	2,632	3,531
Louisiana	13,944	13,483	11,911
North	3,172	3,005	2,920
Gulf	10,772	10,478	8,991
Mississippi	2,593	2,408	2,752
New Mexico	7,191	7,286	6,024
Oklahoma and Kansas	37,290	37,094	36,118
Texas	119,308	117,372	114,010
East Texas	17,288	16,853	14,917
West Texas	44,086	44,306	43,670
Texas Gulf	30,766	30,068	28,591
Other Texas	27,168	26,145	26,932
Rocky Mountain	13,935	13,956	11,756
California	37,586	37,458	34,553
Foreign	7,183	6,143	6,321
Total United States	258,489	256,409	243,671

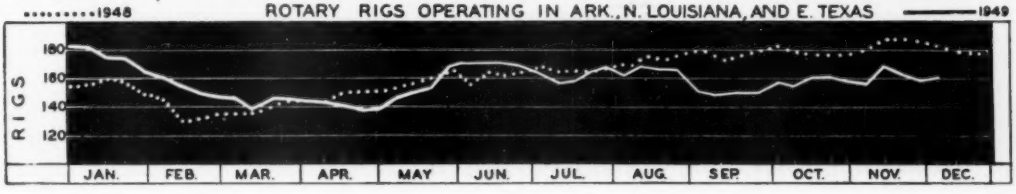
*Bureau of Mines.











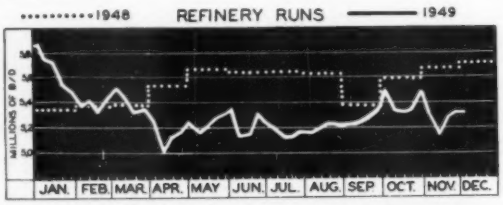
A.P.I. REFINERY REPORT, DECEMBER 3

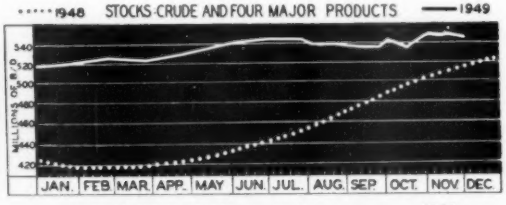
(Thousands of barrels)

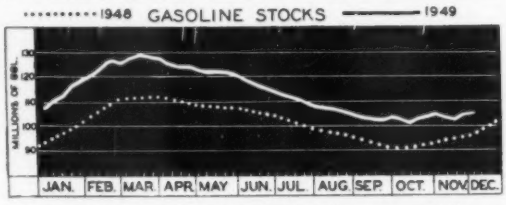
District—	Daily avg crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline†	Kerosine	Distillate	Residual
East Coast	829	333.1	23.4	160.8	225.9	22,288	10,379	28,582	10,530
Appalachian:									
District 1	93	45.7	5.3	16.4	9.6	2,825	392	920	422
District 2	65	34.1	4.3	7.9	16.1	1,375	137	244	174
Ind., Ill., Ky.	856	476.3	65.3	133.6	164.0	21,178	5,117	15,202	4,197
Okla.,* Kans., Mo.	418	231.9	13.7	88.0	59.4	10,020	1,437	6,402	1,732
Inland Texas	206	147.0	11.0	20.3	39.2	3,815	714	1,097	1,375
Texas Gulf Coast	1,313	627.0	106.3	293.0	222.4	15,689	3,639	16,083	7,329
La. Gulf Coast	442	218.6	61.3	90.9	60.9	5,827	1,649	5,081	2,535
N. La. and Ark.	83	31.3	8.4	13.0	13.4	2,299	460	903	310
Rocky Mountain:									
New Mexico	11	6.4		1.7	2.7	85	45	99	31
Other Rocky Mtn.	167	83.3	4.7	28.9	28.4	2,687	395	1,962	605
California	846	355.0	9.9	112.1	349.7	17,176	787	14,873	37,031
December 3, 1949	5,329	2,589.7	315.6	966.6	1,191.7	105,284	25,151	89,448	66,271
November 26, 1949	5,331	2,600.5	290.4	995.9	1,157.7	104,917	26,069	91,795	67,087
December 4, 1948	5,763	2,602.3	355.7	1,036.4	1,334.6	95,235	26,422	79,203	63,912

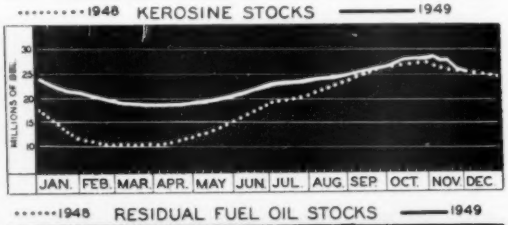
Bureau of Mines, December 1948				
Daily avg crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual
856	322.9	39.8	211.4	241.5
101	45.4	7.7	15.0	14.7
72	36.4	4.9	7.9	14.5
939	483.1	62.5	152.7	158.7
437	240.6	22.5	75.1	80.6
250	162.0	14.8	22.3	59.3
1,468	645.3	112.2	334.1	259.2
452	200.1	58.2	100.4	74.6
85	33.2	8.8	11.3	20.1
14	7.5	0.5	2.1	3.7
152	71.6	4.3	26.4	34.9
965	378.1	13.8	151.7	399.9
5,791	2,626.2	350.0	1,110.4	1,361.7

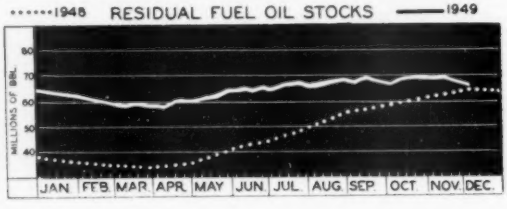
*At refineries including natural blended. †Finished and unfinished.

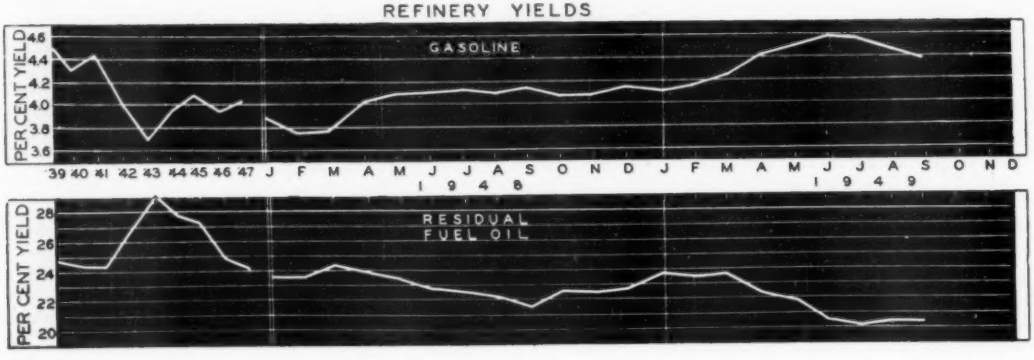











REFINERY YIELDS
GASOLINE
PER CENT YIELD
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1948
1949
RESIDUAL FUEL OIL
PER CENT YIELD

CRUDE PRICES GRAVITY SCHEDULE

Gravity—	Calif. Hill, Signal	Kansas homa, Okla-	Tex.* Coast Gulf	Tex.† West
18-18.9	$1.53			
19-19.9	1.63			
20-20.9	1.73	$2.25		$2.12
21-21.9	1.82	2.27		2.14
22-22.9	1.92	2.29		2.16
23-23.9	2.02	2.31		2.18
24-24.9	2.12	2.33	$2.56	2.20
25-25.9	2.22	2.35	2.58	2.22
26-26.9	2.31	2.37	2.60	2.24
27-27.9	2.37	2.39	2.62	2.26
28-28.9	2.42	2.41	2.64	2.28
29-29.9	2.48	2.43	2.66	2.30
30-30.9	2.54	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.64	2.49	2.72	2.36
33-33.9		2.51	2.74	2.38
34-34.9		2.53	2.76	2.40
35-35.9		2.55	2.78	2.42
36-36.9		2.57	2.80	2.44
37-37.9		2.59	2.82	2.46
38-38.9		2.61	2.84	2.48
39-39.9		2.63	2.86	2.50
40 and above		2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. Above changes do not include recent reductions of a few buyers applying principally to low-gravity grades.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

East Texas†	$2.65
Kettleman Hills, California*	2.77
Beauregard Parish	2.66
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	3.54
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37-37.9°. †35° and above.

COOLER weather in the northeastern part of the country is bringing stability to the heating-oil markets in that area. Esso Standard Oil Co. withdrew the voluntary allowance of .6 cent per gallon for kerosine and reduced the discount on No. 2 fuel oil from .6 cent to .3 cent a gallon. Almost all of the independent suppliers have followed the move and at the end of the week most of the major suppliers had moved their net prices up through reductions in discounts.

The discounts of .6 cent per gallon were started early in November after warm weather had cut distillate and kerosine demands and softened the market. Open market trade in these two products is now described as brisk with little or no material available at old lows.

Residual fuel demand in the New York Harbor area continues strong with prices stable at $2.05 a barrel. Heavy fuel demands in the Gulf-East Coast areas are better than refinery shipments indicate. Increased imports and shipments from California have added to the supply for the past few months.

Group 3 residual markets continue to strengthen and are marked by the absence of distress material even with fairly high sulfur content. Most of the movement is at about $1.00 to $1.05 a barrel with some low-sulfur bringing $1.10. One supplier predicted that the price would be up to $1.25 per barrel before too many weeks.

Movement of No. 2 fuel out of Group 3 territory continues to improve with the price edging up. A larger portion of the total is bringing about 7 cents a gallon, but this is still about 2 cents per gallon less than quotations at this time last year. It would probably take an extremely cold winter to regain that 2 cents this season.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of December 12, 1949. Figures are f.o.b plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Tex. Gulf Coast
Regular gasoline, 74-76 octane	9½-10	10.625-11.1	9¼-9¾
Premium gasoline, 78-80 octane	10⅜-11	12-12.1	10-10¾
42-44 w.w. kerosine	7¾-8¼	8.9	7½-8
No. 2 straw fuel oil	6¾-7¼	8.2-8.5	7-7¼
No. 6 residual	$1.00-1.10	$2.05	$1.65-1.75

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5⅞	5¾	5⅝
Grade 18-55	7.1	6.5	6.8

LUBRICATING OILS SOUTH TEXAS

200 vis., No. 2-3 neutral	10.5
750 vis., No. 3-4 neutral	12.75
2,000 No. 5-6 neutral	14-14.5

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	17-19
200 vis., No. 3 neutral, 0-10 pp.	11.5-14

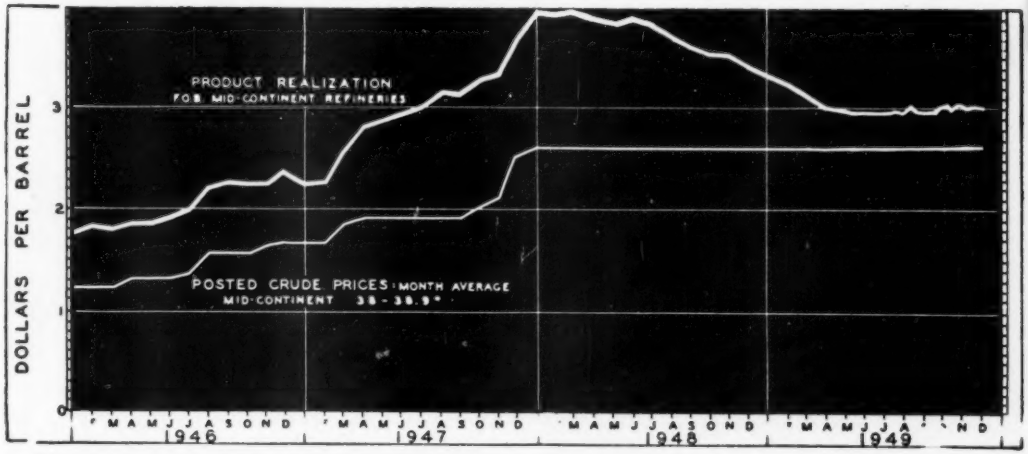
Western Pennsylvania

145-155 vis., 10 p.t. bright stock	19.5-20.5
180 vis., 0 p.t. neutral	20.5-21.5

WAX

Mid-Continent

132-134 A.M.P.	4.25



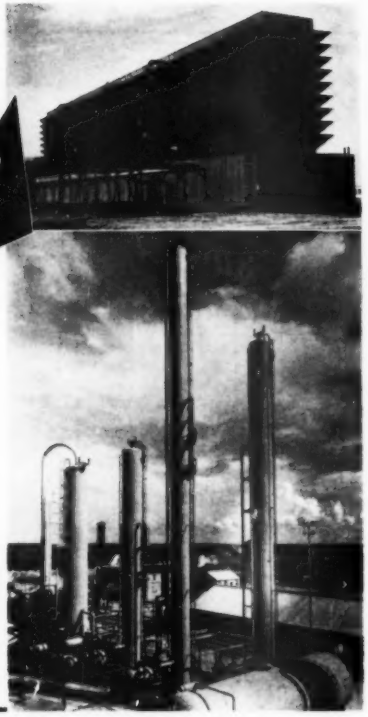
In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil

CONTROL SCALE AND CORROSION

in Cooling Towers, Compressors Engine Jackets—Wherever Water is Used

Wright Chemicals are specifically formulated for individual applications in the Petroleum Industry to protect equipment from scale and corrosion.

There is a Wright Field Engineer near you who will be glad to help you with your water-conditioning problems. No obligation.



Wright CHEMICALS

WRIGHT CHEMICAL CORPORATION

Specializing in Water Conditioning

GENERAL OFFICE AND LABORATORY

615 West Lake Street, Chicago 6, Illinois

OFFICES IN PRINCIPAL CITIES

Sole Distributor of Nelson Chemical Proportioning Pumps

SAVES MANPOWER!

Norris Clutch Type Valve Puller Eliminates Extra Pulling of Rods To Pull Lower Valve . . .

This is no time to waste precious manpower. This is a period that calls for the *conservation* of labor and the *saving* of time—and in pumping wells such a policy demands the use of the Norris Clutch Type Valve Puller. As part of your pumping string, this performance-proved device does *not* retard production or emulsify the oil. But it *is* ready at a moment's notice to pull the standing valve quickly, safely, positively, thus *saving* the extra run of the rods and the time and labor it involves.

Norris Brothers, INC.

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For Speedy, Safe

LOAD-BINDING

Use The New AMF Ratchet-Type Binder

Here's the new safe way to bind loads in the oil country—with the new American Forge ratchet-type binder. Drill pipe, casing, tubing, line pipe, piling, tanks, boilers and heavy equipment bind safely—no kick backs, no exerting thrusts by operator. Light in weight, easy to move, this all-new binder will save you time and money in the field. Ask your local supply store about the American Forge Load Binder and see how it can ease your operations through speedy, safe binding.

American FORGE AND MANUFACTURING CO.

812M Shore Avenue • Pittsburgh 12, Pa.

EQUIPMENT MEN . . . in the News

Turner Is General Manager Of Manufacturing for Ethyl

B. B. TURNER

Ethyl Corp. has announced the appointment of B. Bynum Turner as general manager of manufacturing to assume charge of the company's activities in Baton Rouge, La., the home of its antiknock manufacturing plant. In this capacity he will relieve John H. Schaefer, vice president and director, who returns to the New York office to direct all manufacturing operations from the company's headquarters.

Clinton W. Bond will continue as resident manager in charge of the plant at Baton Rouge. Turner, for the last 2 years, has been coordinator of the $40,000,000 plant-expansion program which is now completed.

Roller Joins Republic as General Manager of Sales

J. S. ROLLER

John S. Roller has joined Republic Supply Co. as general manager of sales. Roller formerly was assistant sales manager of the Birmingham district for Republic Steel Corp.

Don L. Collins, formerly executive vice president and general manager of sales, will continue his duties as executive vice president of Republic Supply Co., which has its headquarters in Houston. Republic has 50 service points in 10 states serving the oil and gas industries.

Guiberson Names Two To Sales Organization

Harry S. Zane, Jr., sales manager, Guiberson Corp., has announced two recent appointments to the sales staff.

R. W. Elliott, formerly associated with Hughes Tool Co., Oil Center Tool Co., and Hughes Supply Co., Ltd., has been appointed sales representative for Guiberson.

Dolton L. Moss, formerly store manager at Odessa, Tex., for Jarecki Manufacturing Co., has joined the sales staff and will represent the company in the West Texas territory.

Driggs to Represent Dresser Manufacturing

R. J. DRIGGS

Announcement has been made by H. Z. Hight, sales manager, Dresser Manufacturing Division, of the appointment of R. J. (Jack) Driggs as West Coast representative. In his new capacity Driggs will cover California, Washington, and Oregon, working closely with gas companies and leading supply houses.

Before joining Dresser, Driggs conducted his own contracting business for several years. He maintains a sales office at San Francisco.

Lufkin is Scene of Kurth Testimonial

On December 14 the Angelina County Chamber of Commerce sponsored a testimonial for Ernest L. Kurth at Lufkin, Tex., with dignitaries from 11 southern states serving on the various committees.

Kurth, recently elected the South's Man of the Year for 1949, is a director of Lufkin Foundry & Machine Co. at Lufkin. In addition, he is president of five industrial firms and the Memorial Hospital Foundation of Lufkin, and is on the board of directors of ten other companies.

According to A. E. Cudlipp, vice president, Lufkin Foundry & Machine Co., who acted as general arrangements chairman for the testimonial, Kurth is accorded the lion's share of the credit for building East Texas into one of the promising industrial areas of the state.

Gov. Allan Shivers headed the invitations committee, comprising key southern publishers, educators, and industrialists. The testimonial honoring the 64-year-old industrialist included addresses by national figures, a "Parade of Industry" on the streets of Lufkin, and open house for visitors, at many industrial plants in the area.

Lufkin Foundry & Machine, like the other firms in Angelina County, conducted tours through its plant.

Wheatley Names O'Connor Export Representative

D. T. O'CONNOR

D. T. O'Connor, formerly with Edward Carter, has formed his own company and has been appointed to represent Frank Wheatley Pump & Valve Manufacture's products in foreign markets, according to Frank Wheatley, Jr., executive vice president of the firm.

A graduate of Klongowes Wood College, Kildare, Ireland, with postgraduate study in London, England, O'Connor is well known in almost every important oil-producing field, domestic and foreign. O'Connor has offices at 500 Fifth Avenue, New York City, and in addition to the Wheatley line, will represent: Shaffer Tool Works; M. J. Crose Manufacturing, Inc.; and Mayhew Machine & Drilling Service, Inc.

Booth Made General Sales Manager of Spang-Chalfant

National Supply Co. has announced appointment of Edwin A. Booth as general manager of sales of the Spang-Chalfant Division of the company. He has been a member of the National Supply organization since 1929.

Upon graduation from Pennsylvania State College Booth entered the metallurgical department of Spang-Chalfant, and 2 years later was transferred to sales. After sales department experience in Pittsburgh and St. Louis, he was appointed manager of the Tulsa district in 1942, returning to Pittsburgh 4 years later in a similar capacity.

Drilex Building District Warehouse at Abilene

Drilling & Exploration Co., Inc., Dallas and Los Angeles, has started construction of a district warehouse on a 20-acre tract located in Abilene, Tex. The new building will provide

storage and other facilities for servicing the company's drilling activities in West Central and western Texas.

While plans are not definite at this time, Drilex may also build an office building on the tract. If erected the office building would house the district offices, currently located in the Compton Building, and possibly other departments which would be moved from the main Dallas offices.

Coyle to Represent Process Industries Engineers, Inc.

Process Industries Engineers, Inc., Pittsburgh, has appointed W. A. Coyle as western New York district manager. The company specializes in the design, application, contracting, servicing, and sales of complete equipment to meet the requirements of processing industries.

The company also represents several manufacturers whose equipment fits into the field of unit process operations. Companies to be represented through the western New York office are Patterson-Kelley Co.; International Engineering, Inc.; Warren Steam Pump Co.; Hetherington & Berner, Inc.; B. H. Hubbert & Sons, Inc.; Gruendler Crusher & Pulverizer Co.; Tri-Clover Machine Co.; Waukesha Foundry & Machine Co.; and Rietz Manufacturing Co.

Superheater, De Laval Canadian Representative

Superheater Co., Ltd., of Montreal, Canada, in conjunction with its affiliate, Combustion Engineering Corp., Ltd., has been appointed to represent De Laval Steam Turbine Co, of Trenton, N. J.

Superheater Co., Ltd., will sell and service De Laval turbines, pumps, gears, and compressors in the provinces of Newfoundland, New Brunswick, Nova Scotia, Prince Edward, and Quebec.

National Supply Opens Two New Stores

National Supply Co. has recently opened two new stores like this one in Elk City, Okla., the second being at Snyder, Tex. The Elk City store will be managed by W. E. Barnes, formerly in the sales department at Stafford, Kans. He will be assisted by W. C. Brady, formerly at the Oklahoma City store, and C. H. Parker, formerly at the Lindsay, Okla., store. R. A. Turney is manager of the Snyder store, under E. M. Braselton, district manager

Averill Named Head of New Catalyst Division

GAGE AVERILL

H. A. Kern, president of National Aluminate Corp., Chicago, has announced that a partial reorganization plan has resulted in the formation of the Catalyst Division, National Aluminate Corp. Production of a fluid type petroleum cracking catalyst is already under way in the corporation's Chicago plant.

To serve as sales manager for the newly formed division, Gage Averill has recently joined National Aluminate Corp. For the past several years Averill has been connected with American Cyanamid Co. where he served as supervisor of sales, petroleum-chemicals department.

Production manager for the catalyst plant will be Dr. D. G. Braithwaite, formerly assistant director of research for National Aluminate Corp. Dr. Braithwaite has been engaged in Nalco's research and development work on catalysts for the last several years.

Charles E. Rogers Is New Stoody Sales Metallurgist

Stoody Co., manufacturers of hard-facing alloys, has announced the advancement of Charles E. Rogers to sales metallurgist. For the past 3 years Rogers has been in charge of the metallurgical laboratory.

Graduating from Harvard in 1930 with a B.S. degree, Rogers served 2 years as superintendent of the largest steel warehouse in the Far East, located in Manila, P. I. Immediately upon returning to the States, an additional 5 years were divided between research assistant and plant superintendent in the manufacture of hard-facing alloys.

This work consisted of developing alloys and their application, as well as plant production and technical control. His new duties at Stoody will include general engineering help and advice to users of Stoody hard-facing alloys.

Republic Supply Co. Opens Snyder Store

Republic Supply Co. opened this permanent store at Snyder, Texas early in November with an enormous barbeque served from the Odessa Chuckwagon. Republic is 40 years old in the oil and gas supply field, and maintains its home office in Houston

Sammons Joins Spencer

Spencer Chemical Co. has announced that J. Y. Sammons has recently been added to its industrial chemical sales staff. He will represent the company in the New York area. Sammons, a graduate of University of Tennessee, was formerly associated with the Barrett division of Allied Chemical & Dye Corp.

(Continued on page 151)

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED

All ads, 12 cents a word. Minimum charge, $3.00 per insertion.
Centered Line, any ad, $1.00.
Box Numbers count 9 words when replies are to be sent to our Tulsa Office. Replies forwarded without charge.

DISPLAYED, PER INCH

$12.00 per column inch per insertion. One-point border and 12-point capitals are allowed. Larger type sizes not accepted.

All classified advertising payable in advance.
10% Discount if 3 insertions are ordered at one time.
COPY DEADLINE, 9:00 a.m. Monday prior to each week's issue.

THE OIL AND GAS JOURNAL
P. O. Box 1260, TULSA, OKLAHOMA

EQUIPMENT FOR SALE

FOR SALE: Lacoste-Romberg gravity meter complete with many accessories and in good operating condition. Available for immediate delivery. $3,000.00 f.o.b. Houston, Texas. Box D-309, The Oil and Gas Journal, Tulsa, Oklahoma.

ROTARY special 5,000′ used outfit complete with 4,500′ of 4½″ drill pipe. Ideal unitized draw works $18,500.00. Also core drills, spudders, tools, cable. We handle new and used well drilling equipment. We rent fishing tools. Pressey & Son, Pueblo, Colo.

HAVE 200,000 feet 7″ 20# seamless casing range 2, J55, A.P.I. New prime. F.O.B. Pittsburg, price $129 per ton. A. H. Johnson, 1936 North Clark Street, Chicago, Ill., Phone MO-hawk 4-3200.

FOR SALE: Two Fairbanks-Morse Diesel Engines, 150 H.P. Twin Cylinder, Horizontal Type. Completely overhauled. $1500.00 each Melton Supply Co., Seminole, Okla.

NATIONAL Pumping Unit HD 60T about 30HP @ $2500. Bethlehem Pumping Unit 7 DC 7 about 7 HP @ $750. Both of the above units are in first class condition. Mid Kansas Pipe & Supply, PO Box 545, Russell, Kans.

FOR SALE

12—230 H.P. Type 10 Bessemer New 17″ Power Cylinders complete ready to run with 16″ to 18″ Compressors. 1—230 H.P. Clark Horizontal with Compressors. Located Salem, Illinois.

ENGLE PETROLEUM, Incorporated
Box 655, Evansville, Indiana

RECONDITIONED PIPE

18 miles of 6″ 18.97 pound lapweld
11 miles of 8″ 28.55 pound lapweld
To be sold on bid January 10, 1950.

TUSCARORA OIL COMPANY, LIMITED
P. O. Box 22, Harrisburg, Pa.

PACKAGED H_2S REMOVAL UNITS

We offer prompt shipment on skid-mounted hydrogen sulfide removal units for treating sour gas for pipe line or fuel gas purposes.

GRAFF ENGINEERING & EQ'PT. CO.
3415 Westminster, Dallas 5, Texas

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

New Wire Rope at Money-Saving Values: Leading brands. Sizes ⅛″ to 1½″. 6x19, 6x37, construction for all purposes. Degen Pipe & Supply Company, Box 107, Red Fork Station, Tulsa, Oklahoma.

ONE H. D. Failing 1500 Mtd. on New G.M.C. Drill pipe, tools, and accessories. Very cheap. P. K. Kelley, Ph. 54-9764, 208 N.W. 38th Street, Oklahoma City, Oklahoma.

CARDWELL 6,000-ft. twin-engine drawworks, two years old, never drilled deeper than 3,400 ft., A-1 condition, D-13000 Caterpillars, Burgess-Manning snubbers, automatic makeup and breakout catheads, pump takeoff, coring drum. Now operating Illinois. Can finance. Keoughan Drilling Co., Fairfield, Illinois.

Several Army Surplus 4½″ x 6″ Gaso Duplex 1860 Pumps—two piece skid mounted with Chrysler 8 cylinder engines. Will sell pumps only or complete units about half price.

H. H. COFFIELD
ATTN: W. H. Orr
Phones: 132—Rockdale, Texas
A-86064—Houston, Texas

NEW PIPE FOR SALE

(Subject to Prior Sale)

5000 Ft. 9⅝″, 36#, J55, Range 2, 8 Rd. Thrd. Seamless Casing
4000 Ft. 8⅝″, 28# Ditto
19,000 Ft. 6″ Std. Byars L.W. W.I. Pipe
Specification ASTM-AF2-33

Contact

National Cooperative Refinery Assn.
Phone 820 McPherson, Kansas

EQUIPMENT FOR SALE

ROLAGRIP COUPLINGS—For Sale, 100 tons, 1½″ to 8″ inclusive. New, never used, complete with bolts and neoprene gaskets. Price 50% less than manufacturers selling price. Send for list. JULIUS M. FOGELMAN, Reading, Pa.

FOR SALE—NEW PIPE
420 Ft. 12″ Std. 49.56# ⅜″ wall. 340 Ft. 8″ extra strong 43.38# ½″ wall. New seamless plain end pipe, low price. Exner-Dodge, Inc., Coffeyville, Kansas.

FOR SALE: Approximately 15,000′ of 6⅝″ O.D. Plain end Line Pipe, in 40 ft. sections. Excellent condition. H. L. Smith, St. Elmo, Illinois, Phone 115.

FOR SALE: 76 Star Spudder SRK Waukesha Motor with or without tools, or trade for smaller spudder. D. B. Wilbur, Centralia, Illinois, P. O. Box 227.

ONE 8′x27½ Type XYCP National Emulsion Treater complete. Never used, located Basin, Wyoming. Considerable reduction. Write Box 754 or phone 93193, Billings, Montana.

FOR SALE—At Houston, 105,000′ of 6″ 12.89# Plain End Bevelled Republic Electric Weld #1 Used Line Pipe. Double random lengths. Cities Service Oil Co., Patridge, Bartlesville, Okla.

FOR SALE

New 150,000 bbl., A.P.I. welded type cone deck tanks complete. 150′ dia. x 48′ high. Available immediate delivery Atlantic Coast Port.
1—New 4x6 Wheatley Oil Shipping Pump complete with electric motor drive.

R. H. TECKLENBORG CO.
811 W. 7th Street, Los Angeles 14, Calif.

BARGAIN

Two **new** Model 6NKU-6NK-20-S "Waukesha" Oilfield Power Units. Latest type—7″ x 8½″, 225 h.p., equipped with Twin Disc power takeoff, gas pressure gauge, safety magneto, 1 CKU starting unit, radiator cooled. Can be used with butane, natural gas, or gasoline.

Cost $6799 each; will sell for $5835 each, f.ob. Cut Bank, Montana.

Central Machinery Co.
Your "Caterpillar" Distributor
Great Falls, Montana

USED PIPE FOR SALE

200,000′—8″ Line Pipe, cleaned and beveled.
50,000′—6″ Line Pipe as taken from ground.
5,840′—18″ Line Pipe as taken from ground.
13,800′—20″ Line pipe as taken from ground.

Interested parties contact:

G. B. PACE
1684 Wiltshire Blvd. Huntington, West Virginia Phone 2-8762

7,000′ CAPACITY ROTARY RIG

Wilson "Giant" Drawworks Serial 6464, powered by Two 8-cylinder LeRoi Engines; 123′ Moorco Portable Mast with 4′-6″ Substructure; B-14 Emsco Pump; SS-250 Ideco Swivel; Regan Traveling Block; 27½″ Oil Well Rotary; 100 B-J Triplex Hook; 6,500′ Excellent 4½″ Drill Pipe. This rig is a splendid value. See it at our Oklahoma City yard.

LUCEY PRODUCTS CORPORATION
624 S. Cheyenne TULSA, OKLA. Phone: LD 204

EQUIPMENT FOR SALE

1 FRANK'S well servicing unit mounted on International truck, also 1 Allis-Chalmers E 60 well servicing unit mounted on tandem International truck. Both units equipped with double legged 62-ft. telescope mast. Complete rods & tubing tools. Shafer Well Servicing, 1219 S. Mekusukey, Wewoka, Oklahoma.

NEW Byron Jackson "Pup" Centrifugal Pumping Units with Chrysler Ind-9 engines — Army surplus — export boxed with parts and tools—condition perfect—supply limited—price attractive—available for immediate shipment from Houston.

HALLORAN EQUIPMENT CO.
431 Kress Bldg. Ph. CA-1447
Houston 2, Texas

FOR SALE
BOILERS
STATIONARY
160# WP—504 HP—with State inspection certificate.
MUST SACRIFICE!
WESTERN STEEL CUTTING, INC.
Dept. 25, P.O. Box 31, Bell, Calif.
Ph.: Los Angeles—LOgan 8-2188

EQUIPMENT FOR SALE

FOR SALE: 2,000 ft. 2⅜" O.D. Range 2 drill pipe, modified A.P.I. tool joints, $2.45 per ft. Houston. Box D-316, The Oil and Gas Journal, Tulsa, Oklahoma.

PIPE FOR SALE: 50,000 ft. selected 2" tubing (not upset) @ 16c ft., several thousand ft. 2" line pipe @ 13c and 3" pipe @ 35c per ft. All used, re-conditioned, fine condition. FOB Titusville. The B. Levy Estate, Titusville, Penna.

FOR SALE: Moore 65 ft. truck mounted type well servicing derrick. Box D-314, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 3 New 10,000 bbl. A.P.I. Columbian Bolted Steel Tanks. 160—8000 & 10,000 Gal. Tank Cars. Darien Corp., 60 E. 42nd St., N. Y., N. Y.

FOR SALE
One new Butler 10,000 barrel bolted steel tank knocked down, complete with fittings, neoprene gaskets, and all necessary parts for setting up. Price—$3,000.00.

TRI-CENTRAL OIL COMPANY, INC.
6265 W. 66th Place Chicago 38, Ill.

EQUIPMENT FOR SALE

FOR SALE: Approximately 25 miles 4" OD plain end pipe in line. Public Service Corp. of Texas, 902 Burk Burnett Bldg., Fort Worth, Texas.

FOR SALE: One 6-DT-317 and one 4-DC-645 Buda Diesel Engine. New engines at 25% off factory list. R. A. Young & Son, Inc., Fort Smith, Arkansas.

EQUIPMENT WANTED

WANTED: Two Sweetland Presses; Size #3 to 7 inclusive. Also, Oil Canner. Oklahoma Refining Company, Box 1265, Seminole, Oklahoma.

ROYALTIES

DEEDED ROYALTIES
San Juan Basin & Permian Basin. Write Harry S. Wright, Wright Bldg., Farmington, New Mexico.

HELP WANTED

WANTED: Graduate Petroleum Engineer for work in Mexico. Minimum five years' experience in completion and production of flowing wells. Knowledge of Spanish desirable. Salary open, depending on experience. Box D-305, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Refinery superintendent for 5,000 barrels per day refinery. Skimming with Dubbs Cracking. Polymer Unit. Location, Kansas. In reply, please give complete information: personal, education, experience, references, and salary expected. Box D-311, The Oil and Gas Journal, Tulsa, Oklahoma

WANTED: Civil Engineer capable of registering in any Southern State including Florida. Experience on Natural Gas Distribution Systems preferred. Address: Littrell Engin. & Constr. Co., Inc., Moultrie, Georgia

EXPERIENCED seismologist for work in division office. Must be capable of highest type seismic interpretative work. Permanent position. Good future. Give full details of education, experience, age, and availability in first letter. All replies held confidential. Address Sun Oil Company, attention L. G. Ellis, Box 2831, Beaumont, Texas.

NEW foreign and domestic Oil Employment Directory. Over 500 listings in drilling, production, refining, natural gasoline plants, pipe lines, geological, exploration, supplies, manufacturers, services; and trucking, refinery and pipe line contractors, showing where to apply for jobs. Price $5.00. Oil Industry Mailing List, Box 2603, Tulsa, Okla. (Our 28th year).

WATCH THIS SPACE FOR OUTSTANDING WEEKLY VALUES

TOWERS & VESSELS
All API-ASME Code

4—3'x12'x7/16" thick shell and heads, 260 # w.p.
1—5'6"x13'x5/16" thick shell and heads, 275 # w.p.
1—5'x13'x1/4" thick shell and heads, 305 # w.p.
4—4'6"x20'x7/16" thick shell and heads, 150 # w.p.
2—36"x8' wi 14" skirt, 275 # w.p.
1—3'6"x72"x7/16"x9/16" shell x 7/16" top head x 9/16" bottom head, 25 tray absorber, 160 # w.p. @ 150° F, mounted on 10'4" skirt.
1—6'x68"x1/2" thick shell and head, 30 tray stripper, 150 # w.p. @ 500° F, radiographed, mounted on 14'6" skirt.
1—5'6"x70"x1" thick shell and heads, 30 trays depropanizer, 350 # w.p. @ 300° F, stress relieved and radiographed, mounted on 5' skirt.
1—3'6"x16'x5/8" thick shell and heads, reflux accumulator.
1—7'x30'x9/16" thick shell and heads, 170 # w.p.
1—5'x16'x15/16" thick shell and heads, 400 # w.p.
1—7'x30'x5/8" thick shell and heads, 180 # w.p.
1—5'x16'x1/2" thick shell and heads, 150 # w.p. stress relieved and radiographed.
3—24"x4'x1/4" thick shell and heads, 50 # w.p.
1—20x"4'11/16"x3/8" thick shell and heads, 200 # w.p. @ 150° F.
1—3'x6'x3/8" thick shell and heads, 125 # w.p. @ 150° F, stress relieved.
1—5'x15'x13/16" thick shell and heads, 250 # w.p. @ 200° F.
1—5'6"x50'x7/8" thick shell and heads, 20 tray BB rerun column, 250 # w.p. @ 300° F, stress relieved and radiographed.
3—6'10"x21'6"x7/8" thick shell and heads, Stratco contactors w/ inner shell 5'3⅜"x15'7"x1/2" thick shell and heads and G-R tube bundle 1½" steel pipe and 3.37" OD G. fins, shells stress relieved.
1—12'x66'x3/4" thick shell and heads, 29 tray stripper column, 100 # w.p. @ 200° F, stress relieved and radiographed, mounted on 9'4" skirt.
2—12'6"x85'5"x1" thick shell x 5/8" thick heads, 40 tray extractor columns, 150 # w.p. @ 300° F, radiographed only, mounted on 16'7" skirt.
2—12'x22'x15/16" thick shell and heads, 150 # w.p. @ 200° F, radiographed.
1—3'x7'x1/4" thick shell and heads, 50 # w.p. @ 300° F.
2—6'x38'x7/8" thick shell and heads, 250 # w.p. @ 300° F, stress relieved and radiographed.
1—7'x60'x9/16" thick shell and heads, 25 tray concentrator, 150 # w.p. @ 450° F, mounted on 5'11" skirt.
1—3'x5'x5/16" thick shell and heads, 50 # w.p. @ 350° F.
1—7'x30'x9/16" thick shell and heads, 150 # w.p. @ 200° F, stress relieved and radiographed.
1—3'6"x16'x5/16" thick shell and heads, 50 # w.p. @ 200° F.
1—4'6"x16'x3/8" thick shell and heads, 110 # w.p. @ 150° F.
1—9'x20'x3/8" thick shell and heads, 50 # w.p. @ 180° F.
1—6'x4'10"x7/16" thick shell and heads.
1—6'x13'x5/16" thick shell and bottom, open top.
2—36"x8', 275 # w.p. air receivers, National Board stamped, mounted on 14" skirt.
1—3'x6'x3/8" thick shell and heads, 125 # w.p. @ 150° F, stress relieved, mounted on 2'9" dia x 6" high skirt.
4—3'x12'3"x3/8" thick shell x 7/16" thick heads, 180 # w.p. @ 650° F, stress relieved and radiographed.
1—10'x25'x11/16" thick shell and heads, 100 P.S.I. vacuum 15" @ 250° F, stress relieved and radiographed.
1—6'x8'x1/4" thick shell and heads.
1—4'6"x10'x1/4" thick shell and heads, 50 # w.p. @ 150° F.
1—3'6"x30'x1/2" thick shell and heads, 10 tray regeneration column, 175 # w.p. @ 450° F, stress relieved and radiographed, mounted on 4'9" skirt.
1—3'6"x30'x1" thick shell and heads, 6 side pans, regeneration column, 250 # w.p. @ 450° F, stress relieved and radiographed, mounted on a 4'9" skirt.
1—12'x33'x1-1/16" thick shell and heads, 155 # w.p. @ 200° F, stress relieved and radiographed.
1—4'x16'x9/16" thick shell and heads, 175 # w.p. @ 150° F, stress relieved.
1—3'6"x6'x3/8" thick shell and heads.
1—11'x95'x1/2" thick shell and heads, 180 # w.p., stress relieved and radiographed.
2—8"x3' scrubber, 50 # w.p.
1—24"x5'x1/4" thick shell and heads, 50 # w.p.
1—3'6"x5'x1/4" thick shell and heads, 35 # w.p.
1—3'6"x15'x5/16" thick shell and heads, 100 # w.p. @ 200° F.
1—15½"x58"x1/2" thick shell x ½" flgd. head x ½" conical bottom.
1—4'x26'x5/16" thick shell and heads, 35 # w.p. @ 150° F, mounted on 8' skirt.
1—7'x40'x3/8" thick shell and heads, 50 # w.p. @ 150° F.
2—2'6"x15'x3/8" thick shell and heads, 150 # w.p. @ 450° F.
1—3'x25'x3/8" thick shell and heads, 175 # w.p. @ 200° F, mounted on 3' skirt.
1—4'x16'x1/2" thick shell and heads, 175 # w.p. @ 200° F.
1—4'6"x16'x1/2" thick shell and heads, 150 # w.p. @ 200° F.
1—4'6"x50'x3/8" thick shell and heads, 20 tray rerun column, 50 # w.p. @ 450° F, mounted on 10' skirt.
1—6'x15'x5/16" thick shell and heads.

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BOX D-306
THE OIL AND GAS JOURNAL
Tulsa, Oklahoma

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PRODUCTION Superintendent, graduate petroleum engineer, 36, experienced all phases drilling, completion, production. Desire responsible connection with active organization. Excellent references. Box D-295, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM Engineer: 4 years experience in drilling, production, and reservoir engineering. Want work with Major or Independent preferably in Mid-Continent Area but will go anywhere. 27 years old and single. Excellent recommendations. Box D-310, The Oil and Gas Journal, Tulsa, Okla.

GEOLOGIST, B.S., 3½ yrs. subsurface experience in Cuba and Venezuela, desires a position with aggressive company, preferably domestic. Box D-308, The Oil and Gas Journal, Tulsa, Oklahoma.

INSTRUMENT ENGINEER—Thirteen years supervisory, engineering, and maintenance experience in petroleum refinery and chemical plants. Box D-307, The Oil and Gas Journal, Tulsa, Oklahoma.

BUSINESS manager, contact man. Fourteen years in drilling industry. Age 36. Box D-303, The Oil and Gas Journal, Tulsa, Oklahoma.

DESIRES CHANGE: Refining and Production Material Man. Experienced in Auditing, Inventory, Control, Purchasing and Sales. Can furnish the best of references. Age 35. Box D-302, The Oil and Gas Journal, Tulsa, Oklahoma.

MECHANICAL ENGINEER: B. S., 2½ years Refinery and Gasoline Plant Design, 4 years Glitsch Tray Design. Married, Age 28. Available January 1. Box D-298, The Oil and Gas Journal, Tulsa, Oklahoma.

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FOR SALE: Oil and Gas Lease W½ Sec. 1 T 19 N. R68W, located in Laramie County, Wyoming, being 329.97 acres approximately. C. A. Jensen, 704-15th Ave., N.W., Ardmore, Oklahoma.

SCURRY COUNTY ROYALTY: Portion of land owner's ⅛ available. N. E. Quarter Section 211, Block 97. By Owner, P.O. Box 1493, Laredo, Texas.

OIL AND GAS Lease on 160 acres S.E. ¼ Sec. 20 T. 1 So. Range 8 W.I.M. For Drilling Contract with 1/16 override. Allan S. Willis, Lawton, Oklahoma.

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Equipment Men

(Continued from page 148)

May Made General Sales Manager for Blackmer Pump

S. C. MAY

Stephen C. May has been named vice president and general sales manager of Blackmer Pump Co., Grand Rapids, according to B. L. Gordon, president. May has had extensive contact with petroleum producing and marketing, chemical processing, general industrial, and jobbing applications of hydraulic equipment.

He formerly served as consulting sales counselor with Auto-Soler Co., in sales executive capacities with Pacific Manufacturing Corp. and Iron Fireman Manufacturing Co., and as vice president and sales manager of Darling Valve & Manufacturing Co.

Metal & Thermit Makes Five New Appointments

Metal & Thermit Corp., New York, has announced several new appointments and transfers.

Bernard W. Weber has been appointed manager of its detinning and electrode manufacturing plant at East Chicago, Ind. Weber formerly was manager of the Seattle plant of American Can Co. W. S. Leinhardt, formerly general superintendent of the East Chicago plant, is now at the Metal & Thermit executive offices in New York as technical assistant to the vice president of production.

William C. Cuntz, formerly manager of the company's sales office and warehouse in Pittsburgh, has been made district manager at Chicago. Cuntz joined M. & T. in 1935 as sales engineer in the Thermit department. Orville T. Barnett, formerly manager of the Newark office, has been appointed district manager at Pittsburgh. Barnett joined M. & T. in 1940 as engineer of tests in the electrode department. Robert T. Brown, who formerly headed technical service on both electrodes and Thermit, has been made district manager at Newark, N. J.

Denig, D'Alelio Given Important Koppers Posts

Two important administrative changes, placing new managers over the production and research departments of Koppers Co., Inc., have been announced by Brehon Somervell, president.

Fred Denig, vice president, has been

made manager of the company's production department. Dr. G. Frank D'Alelio has been named vice president and manager of the research department, the position formerly held by Denig.

Somervell said that the changes were made necessary by the resignation, because of ill health, of Hugh C. Minton, vice president, who has directed the production department. Koppers' president also announced that Dr. A. R. Powell, who has been assistant manager of the research department, has been made associate manager of that department.

Denig, who joined Koppers in 1921 and has been a vice president and manager of its research department since 1934, was chosen for the production post because of his wide knowledge of the operations of Koppers' 6 divisions and 58 plants, Somervell said.

Dr. D'Alelio, who joined Koppers in August 1947 as an assistant manager of the research department, is widely known in the United States as one of the nation's authorities on plastics. Dr. Powell joined Koppers in 1923 after 4 years' research on coal, gas, and other fuels for the U. S. Bureau of Mines.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D.C. Notice is hereby given that the lands listed herein are offered through sealed bids on the terms hereinafter specified, to qualified bidders of the highest cash amounts per acre as a bonus for the privilege of leasing the lands under sec. 17 of the Leasing Act of February 25, 1920 (41 Stat. 437; 30 U.S.C. sec. 181), as amended. All bids must be submitted to the Director, Bureau of Land Management, Washington 25, D.C., on or before 1 p.m. of the date set out herein. Each bidder must submit with the bid one-fifth of the amount bid in cash or by certified check on a solvent bank or by money order made payable to the order of the Treasurer of the United States, and file the showing of qualifications to receive a lease required under 43 CFR 192.42 (a) (2) and (a) (3), Circular 1730. The envelopes should be plainly marked that they are not to be opened before the date and hour set out herein, and should show the number of the parcel and the name of the field. No bids received after the hour fixed herein for receiving bids will be considered. The remainder of the bonus and the annual rental must be paid and an acceptable surety bond in the sum of at least double the amount of rental, but in no case less than $1,000 nor more than $5,000, must be furnished by a successful bidder prior to the issuance of a lease. An acceptable $5,000 surety bond will be required prior to commencing drilling operations on the land. The deposits of the other bidders will be returned upon acceptance of the successful bids. Bidders are warned against violation of section 1860, Title 18, U. S. Code, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids. Royalties payable to the United States will be at the rate of 12½ per cent to 25 per cent for oil, and 12½ per cent to 16⅔ per cent for gas, in accordance with Schedule B in the lease form. Annual rental will be at the rate of $1.00 per acre. The lands are on the known geologic structure of the Caddo field, Louisiana, and are offered in the following parcels: T. 19 N., R. 16 W., La. Mer., Parcel No. 1, sec. 4, S½NE¼, 79.45 acres. Parcel No. 2, sec. 6, lot 1, 7.40 acres. T. 20 N., R. 16 W., La. Mer., Parcel No. 3, all fractional sec. 20, 37.83 acres. Parcel No. 4, sec. 32, lots 1 and 3, 91.56 acres. Total 216.24 acres. Bids must be submitted on or before 1 p.m., December 28, 1949, and must be submitted on each parcel separately, but no objection will be made to the award of more than one parcel to the same successful bidder. Marion Clawson, Director.

ADVERTISERS IN THIS ISSUE

Ajax Flexible Coupling Co., Inc. 120
Aluminum Co. of America 23
Amercoat Div. American Pipe & Construction Co. 29
American Brass Co., The 94
American Cable Division of American Chain & Cable Co., Inc. Inside Back Cover
American Forge and Manufacturing Co. 146
American Locomotive Company, Alco Products Division 121
Baash-Ross Tool Company 77
Baird Mfg. Co. 134
Baker Oil Tools, Inc. 126, 135
Baroid Sales Division, National Lead Company 6
Beech Aircraft Corp. 9
Bellfield Valve Division, Minneapolis-Honeywell Regulator Co. 17
Boyd Company, Clarence L. 107
Briggs Bituminous Composition Co. 107
Cable & Stine 128
Cannon Electric Development Company 113
Cast Iron Pipe Research Association 113
Chicago & Southern Air Lines 112
Chicago Bridge & Iron Company 53
Chrysler Corporation, Industrial Engine Division 32
Classified Advertising 149, 150, 151
Coody Bender Co., The 102
Crose Manufacturing Co., Inc., M. J. 110
Cutler-Hammer, Inc. 27
Dean Brothers Pumps, Inc. 110
Dragon Mfg. Co. 131
Drilling & Service, Inc. 133
du Pont 1
Edward Valves, Inc. 12
Ensign Carburetor Company 59
Fairbanks-Morse & Co. 2
First National Bank & Trust Co. of Tulsa, The 87
Fulton & Company, R. H. 100
Gates Rubber Co., The 16
General Electric Company 24, 25
GMC Truck & Coach Division, General Motors Corporation 18
Geograph Company, The 134
Grancell, I. H. 115
Grant Oil Tool Co. 129
Hardesty Co., Inc., W. C. 8
Huey & Co., S. E. 102
Hughes Tool Co. Back Cover
International Nickel Company, Inc., The 36
Jensen Brothers Mfg. Co. 139
Jones & Laughlin Steel Corp. 67
Jones & Laughlin Supply Co. 13
Kellogg Co., The M. W. 90
Kerotest Manufacturing Co. 30
Keuffel & Esser Co. 110
Kinzbach Tool Co., Inc. 139
Koch Engineering Company, Inc., The 7
Levingston Shipbuilding Co. 68
Link-Belt Company 5
Macco Corporation 118
Macwhyte Co. 3
Magnolia Airco Gas Products Co. 21
Maintenance Engineering Corp. 125
Marman Products Co., Inc. 113
Martin-Decker Corp. 140
McCord Corporation 109
McGregor Working Barrel Company 128
McKissick Products Corporation 89
Minneapolis-Moline 139
Mission Mfg. Co. 106
Monsanto Chemical Company 4
National Airoil Burner Co., The 121
National Geophysical Company, Inc. 122
Nordstrom Valve Division, Rockwell Manufacturing Co. 103
Norris Brothers, Inc. 146
Oil and Gas Journal, The 136
Oil Center Tool Co. 15
Oklahoma Contracting Co., Inc. 101
Pacific Gear & Tool Works 31
Paris Distributor, Inc., Henry H. 132
Parkersburg Rig & Reel Co. 117
Peerless Pump Division of Food Machinery and Chemical Corporation 22
Pelican Well Tool & Supply Company 131
Penberthy Injector Co. 116
Pennsylvania Flexible Metallic Tubing Co. 104
Perma-Flex Decal Co. 131
Perrault Brothers 102
Petroleum Electric Power Assn. 10
Pipeline Cleaners Co. 102
Pittsburgh Lectrodryer Corp. 11
Porto-Pump, Inc. 116
Preformed Wire Rope Manufacturers 34
Rector Well Equipment Co., Inc. 131
Reed Roller Bit Company 80, 81
Regan Forge & Engineering Co. 72
Reilly Tar & Chemical Corp. 107
Republic Steel Corporation 108
Roebling's Sons Company, John A. 13
Ross Heater & Mfg. Co., Inc. 26
Ross-Martin Co. 116
Shand & Jurs Co. 137
Skirvin Hotels 112
Smith Oil Tool Co., H. C. 114
Snap-On-Tools Corporation 28
Standco Brake Lining Co. 115
Sterling Machinery Corp. 120
Taylor Forge & Pipe Works 96
Texas Company, The 14
Texas Electric Steel Casting Co. 93
Thermoid Company 111
Thompson-Hayward Chemical Co. 136
Tretolite Company Front Cover
Tulsa Pipe Coating Co. 109
Universal Oil Products Co. 56, 57
Vapor Recovery Systems Co., The 33
Visco Products Co., Inc. 55
Wales Trucking Co. 102
Warren Petroleum Corporation 38
Western Gear Works 31
Williamson, Inc., T. D. 105
Wilson Manufacturing Co., Inc. 127
Wilson Supply Company 84, 85
W-K-M Company, Inc. 20
Wright Chemical Corporation 146
Wyatt Metal & Boiler Works Inside Front Cover
Wyodak Chemical Company 130

CALENDAR OF EVENTS

January

Kansas Independent Oil and Gas Association, annual meeting, Wichita, January 16.

February

American Institute of Chemical Engineers, regional meeting, Houston, February 26-March 1.

American Society for Testing Materials, spring meeting, Hotel William Penn, Pittsburgh, February 27-March 3.

Southern Gas Association, meter and regulator conference, Houston, February 9-10.

March

American Petroleum Institute, Division of Production, Southwestern District meeting, Adolphus Hotel, Dallas, March 8-10.

Indiana Independent Petroleum Association, spring convention, Hotel Severin, Indianapolis, March 9-10.

Western Petroleum Refiners Association, annual meeting, Plaza Hotel, San Antonio, March 27-29.

American Petroleum Institute, Division of Production, Mid-Continent district meeting, Skirvin Hotel, Oklahoma City, March 29-31.

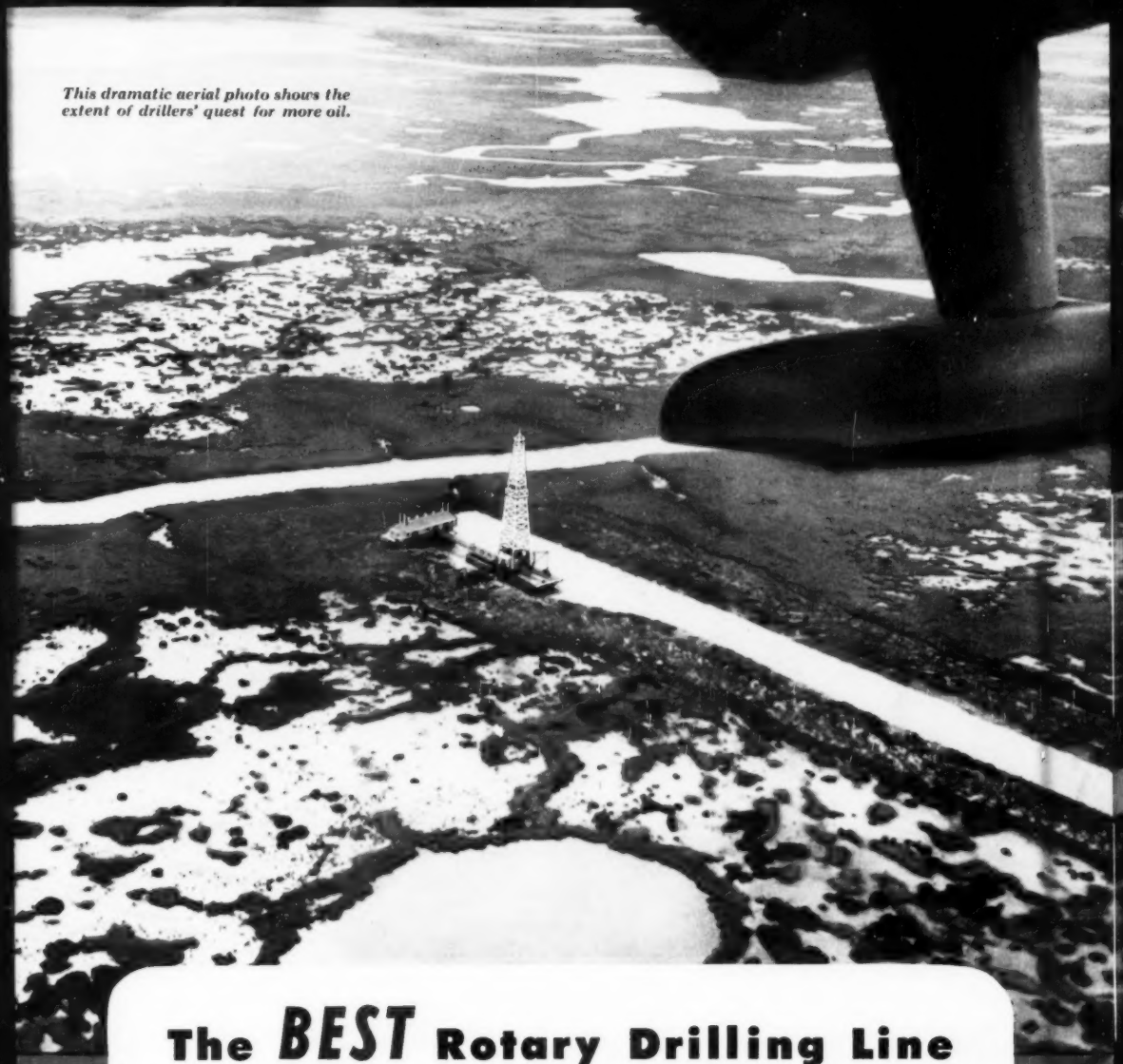
NOMADS

Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Dallas Nomads, first Monday of each month, Texas Room, Baker Hotel.

Houston Nomads, second Monday of each month. Ye Ole College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month, Jonathan Club.



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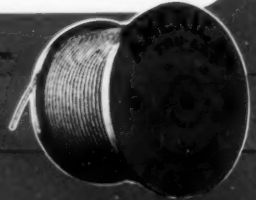

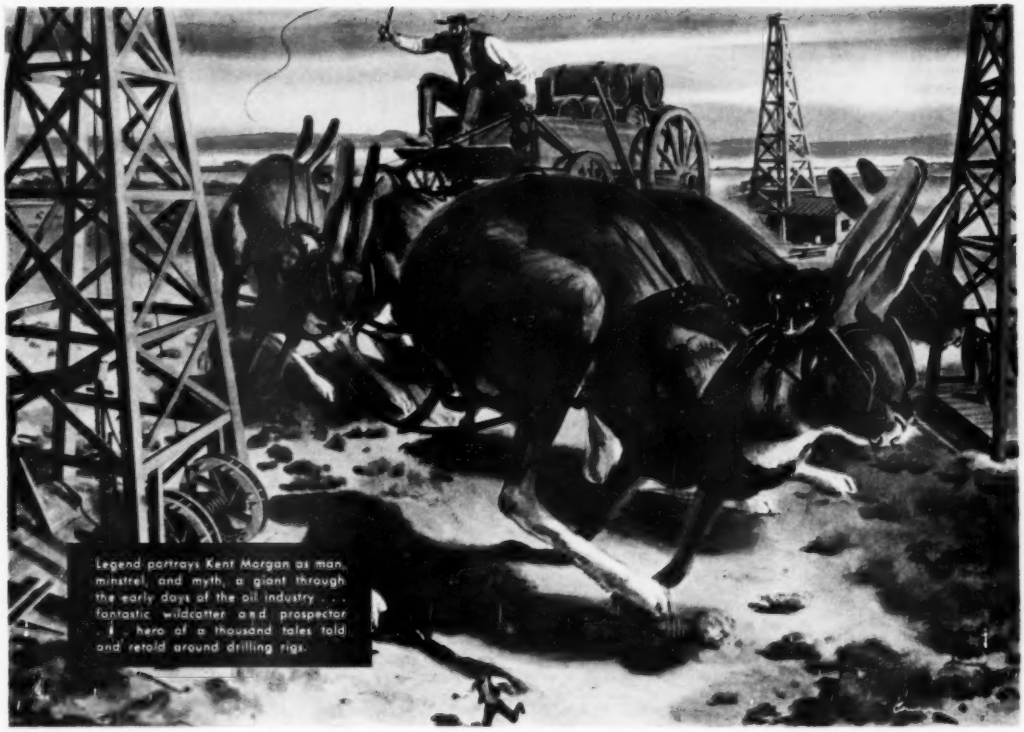

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Kent Morgan's jack rabbit team

However fabulous are the stories told by old-timers about the mule skinners who brought "black gold" out of the fields before pipeline days, the "tops" in oil lore tales is the story of Kent Morgan's Jack Rabbit Team. Always a man who did big things in a bigger way, Morgan raised jack rabbits that were as "sizeable as small elephants," as the story goes. With the speed of a modern jet plane the Morgan Rabbit Team could make thirty trips a day from oil field to rail center with a thousand barrels of crude per trip. Soon the mule skinners were facing disaster because of this transportation competition. But Morgan, being a live-and-let-live fellow, sold his rabbits to Paul Bunyan who was moving a glacier at the time, thus giving his fellow teamsters a break and allowing himself a respite to plan for another of his fabulous undertakings!

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